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## Collective Awe: The Effects of Shared Experience

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**Collective Awe: The Effects of Shared Experience**

A Thesis

Presented in

Partial Fulfillment of the

Requirements for the Degree of

Master of Science

By

Martha Szekely

August, 2021

Department of Psychology

College of Science and Health

DePaul University

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**Thesis Committee**

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## **Biography**

The author was born in Cleveland, OH, on July 13, 1994. Martha graduated from Highland High School, in Medina, OH, 2013. She received her Bachelor of Arts in Psychology from Miami University in 2017.

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## Abstract

Awe, as a complex positive emotion that mixes wonder, veneration, and/or dread, has been shown to induce a small sense of self. In the current research, we focused on the question of whether sharing an awe experience has an impact on that experience. We conducted two studies in which we explored the effects of “collective awe” as it relates to awe intensity, awe-related emotions, self-diminishment, and wellbeing. In addition, based on previous research, we hypothesized that participants with higher awe intensity ratings and awe-related emotion scores would score higher on self-diminishment and wellbeing measures than participants with lower awe intensity ratings and awe-related emotion scores. In Study 1, participants wrote about a time when they experienced awe as either an individual or shared experience. Study 2 participants watched an awe-inducing or neutral video, either alone or with another person. In both studies, participants completed measures of awe and awe-related emotions, self-diminishment, and wellbeing. We found little evidence that shared and individual awe experiences differ. There was also conflicting evidence for the hypothesized impact of awe on self-diminishment. Lastly, we found some evidence in support for the hypothesized impact of awe on wellbeing. Future research is needed to understand the impact of shared experience on awe and how it is associated with different aspects of self-diminishment as well as how and when it is associated with wellbeing.

*Keywords: Awe, Shared Experience, Self-Diminishment, Wellbeing*

### **Collective Awe: The Effects of Shared Experience**

Men go forth to marvel at the height of mountains, and the huge waves of the sea, the broad flow of the rivers, the vastness of the ocean, the orbits of the stars, and yet they neglect to marvel at themselves.

*Saint Augustine*

Abdul wakes up at 11:30pm full of anticipation. It does not matter that he only got 3 ½ hours of sleep. That fact was miniscule in comparison to what was to come. He packs up his gear and starts on his 6-hour journey to the top of the highest 14ner in Colorado, USA, Mount Elbert. When he reaches the top, he collapses onto the ground and starts to go through his bag to find his water. He looks up, bringing his water bottle to his lips, then suddenly stops. Time appears to have frozen. All he can manage to do is take in what lies before him. From the vastness of the mountains in the distance to the vastness of the colors from the sunrise touching everything in sight, he begins to feel small in comparison. He begins to feel awe. He looks over his shoulder at his friends, Ashanti and Oliver, and his feeling of awe only intensifies as he realizes that they will be able to connect on this shared experience for years to come.

The above narrative highlights a key finding about the psychology of awe: that it is associated with feelings of self-diminishment (Campos et al., 2013; Piff et al., 2015; Shiota et al., 2007). It also underscores an unstudied question about the awe experience: whether it differs as a function of the absence or presence of others. The primary aims of the research reported in this thesis were to (1) *test* the replicability of self-diminishment as an outcome of experiencing awe, (2) *test* the impact of awe on wellbeing, and (3)

*explore* the impact of shared experience. Two studies were designed to address these aims.

### **Defining Awe**

Awe is defined as an emotion variously combining dread, veneration, and wonder that is inspired by authority or by the sacred or sublime (<https://www.merriam-webster.com/dictionary/awe>). The definition exemplifies the complexities of the emotion and past research has attempted to further clarify the conceptual experience of awe as well as address how it may differ from related states such as amazement, inspiration, wonder, anxiety, dread, fear (Bonner & Friedman, 2011; Weger & Wagemann, 2018; Keltner & Haidt, 2003). Awe is a relatively new construct of interest in psychology and is predominantly studied in humanistic, transpersonal, and positive psychology in addition to the psychology of religion (Bonner & Friedman, 2011). It is considered to be a self-transcendent positive emotion, an epistemological positive emotion, and an aesthetic emotion (Van Cappellen et al., 2016; Bonner & Friedman, 2011; Shiota et al., 2006; Keltner & Haidt, 2003). Although psychological research on awe is relatively young, it has historically been a prominent subject throughout discussions regarding religion, philosophy, and sociology (Keltner & Haidt, 2003; Bonner & Friedman, 2011).

### ***Core Appraisals***

Keltner and Haidt (2003) suggested that perceptual vastness of a stimulus and having a need for accommodation are two key factors that are necessary for the experience of awe.

**Perceptual Vastness.** Vastness is defined as anything that is experienced as being much larger than the self, or the self's ordinary level of experience, or a typical frame of

reference (Keltner & Haidt, 2003). For example, people can experience vastness in either a cognitive, physical, or social context. Someone could perceive cognitive vastness when contemplating the Big Bang Theory. Someone could also perceive physical vastness in the presence of a mountain or a skyscraper. Moreover, they could perceive social vastness in the presence of someone who holds a position of power as well as in the presence of someone who is famous.

**Need for Accommodation.** Keltner and Haidt (2003) highlight that the need for accommodation is another central feature of an awe experience. According to Piagetian cognitive processes, individuals create certain schemas, or mental representations of their world, in order to better understand and navigate ever-changing environments (Shiota et al., 2007). When they are unable to assimilate new information into their pre-existing schemas, people need to then accommodate that new information in order to update their pre-existing schemas or create a new one (Shiota et al., 2007). For example, someone could see the ocean for the first time and assimilate that new information into a pre-existing schema involving other known bodies of water. On the other hand, someone from a brightly lit city may see the stars for the first time in the countryside and need to accommodate that new information by creating a new schema to better understand how vast the night sky is. As a result, they may experience awe.

### ***Awe Valence and Related Constructs***

**Awe as Positive.** Awe-related experience may be flavored by beauty, ability, virtue, the supernatural, or even by threat (Keltner & Haidt, 2003). For instance, threat-based awe could be experienced when perceiving the physical vastness of a tornado, while aesthetic-based awe could be experienced when perceiving the physical vastness of

a rainbow. However, even though threat-based awe may exist, awe is considered by many to be a positive emotion. Moreover, it tends to be experienced as such, in that individuals tend to report more beauty-based awe experiences than other forms (Shiota et al., 2007; Piff et al., 2015).

***Awe and Wellbeing.*** This positivity has implications for wellbeing, and there is some evidence for links between awe and wellbeing. People who experience awe have been suggested to have enhanced overall wellbeing. This can occur in a religious/spiritual context as well as result from awe-induced perceptions of increased time availability (Van Cappellen et al., 2016; Rudd et al., 2012). Awe also tends to promote extrinsic collective engagement and helps the self to transcend its own needs for the good of the group (Stellar, Gordon, Piff et al., 2017). As a result, it promotes prosocial behaviors and group cohesiveness (Stellar, Gordon, Piff et al., 2017). Each of these has been suggested to be involved in the promotion of overall wellbeing. In addition to promoting prosocial behaviors and group cohesiveness, awe may play a significant role in the promotion of feelings of universality and connectedness (Van Cappellen & Saroglou, 2012). Consequently, feelings of universality and connectedness aid in the promotion of perceived meaning in life, which may also be crucial for overall wellbeing (Steger et al., 2006).

As a self-transcendent emotion, awe has been suggested to increase overall life satisfaction, which is beneficial for wellbeing (Stellar, Gordon, Piff et al., 2017; Rudd et al., 2012). Awe shifts the focus from the self to others, so people may report increased life satisfaction because they are no longer judging or comparing their circumstances to a perceived standard. When they are not focused on the self and how it may or may not

measure up, then they may have more satisfaction with their life because they feel like they can be fully present.

***Awe and Self-Diminishment.*** Self-diminishment occurs when an individual is uncharacteristically less aware of the self (Shiota et al., 2007). It may take place during an awe experience when an individual feels an increased sense of connectedness to the world around them and has a decreased awareness of what may typically trouble them (Shiota et al., 2007). For instance, Shiota et al. (2007) found that participants were more likely to be fully present and less aware of the self when describing a nature-related awe experience versus describing an accomplishment. Moreover, upon reflection of an awe experience, compared to a neutral or a pride experience, individuals are more likely to experience self-diminishment by way of sensing that there is something greater than oneself (Piff et al., 2015). Consistent with these findings, Piff et al. (2015) also found that participants were more likely to report feeling small or insignificant as well as that they were a part of something bigger than themselves. This only occurred after watching an awe inducing video versus a neutral video or an amusement inducing video. Moreover, awe is distinct in that it has been the only positive emotion to be associated with feelings of smallness (Campos et al., 2013). Awe has also been suggested to promote both interpersonal trait and state humility by way of intrapersonal self-diminishment (Stellar, Gordon, Anderson et al., 2017).

### **Unanswered Questions**

Although research suggests that awe is good for overall wellbeing through the promotion of social connection, we are not sure how the asocial positive emotion may be

affected when an individual experiences it with others. Sharing an experience is suggested to heighten emotion, but awe may be different.

### ***Shared Experience***

Shared attention theory suggests that people direct more cognitive resources towards a stimulus when they are attending to that same stimulus with others compared to when they are attending to it when they are alone (Shteynberg, 2015). Experiencing higher affective intensity, among other things, result from this shared attention. Sharing an experience—having an experience with another person present rather than having the experience alone—can amplify a person’s personal experience even when communication does not take place (Boothby et al., 2014). Boothby et al. (2014) found that participants rated sweet chocolate as tasting better and being more flavorful when they ate it with another person versus eating it alone and bitter chocolate as being worse when they ate it with another person versus eating it alone. This could be due to the individuals engaging in shared attention within the shared experience. Research also suggests that sharing an experience can amplify the emotional experience (Wagner et al., 2014). Participants reported having more positive feelings when viewing both positive and negative images with a friend versus when they viewed them alone (Wagner et al., 2014).

**Awe and Shared Experience.** Predicting the effects of shared experience on awe is not straightforward, as different perspectives offer different predictions.

***How Shared Experience Might Intensify Awe.*** Sharing an experience has been shown to amplify reactions to the experience (Boothby et al., 2014; Wagner et al., 2014). Shared Attention Theory suggests that people direct more cognitive resources toward a

stimulus when they are attending to that same stimulus with others compared to when they are attending to it when they are alone (Shteynberg, 2015). As a result, sharing an awe experience may amplify the overall emotion experience. Moreover, awe promotes feelings of universality and connectedness (Van Cappellen & Saroglou, 2012) as well as group cohesiveness (Stellar, Gordon, Piff, et al., 2017). This may further suggest that sharing an awe experience may amplify the emotion experience. If more than one person is directing cognitive resources toward an awe inducing stimulus, then they may experience an amplified version of awe and therefore connection to those around them.

***How the Nature of Awe Might Counteract the Effects of Shared Experience.***

Awe is suggested to be different from other positive emotions, such as happiness, in that it is an asocial emotion. When experiencing awe, a person's focus tends to be directed toward the environment instead of toward the self (Shiota et al., 2007). This could be due to the finding that awe-eliciting stimuli tend to be more complex and information-rich in nature, so individuals may need to focus more on processing the challenge that the stimuli present and not on their interactions with those around them (Shiota et al., 2007). As a result, sharing an awe experience may not amplify the overall experience because individuals may not be able to register the presence of someone else due to the concentration required to accommodate such an experience. Moreover, to the extent that another's presence might actually distract from the awe-inducing stimulus, shared experience might even attenuate awe.

**Overview, Hypotheses, and Research Questions**

The present research has two goals. The primary goal was to explore how shared experience may influence awe. Three plausible outcomes were identified: (1) Collective



experiences, relative to individual experiences, could induce more awe if the shared experience prompts more attention to the awe-inducing stimulus. (2) Collective and individual awe experiences could be equivalent, if the asocial nature of awe counteracts the effects of shared experience. (3) Collective experiences, relative to individual experiences, could induce less awe, if the presence of others distracts from the awe-inducing stimulus.

The secondary goal was to contribute to the understanding of awe–wellbeing relationship by exploring self-diminishment as a potential mediator. We conducted two studies in which we manipulated the individual versus collective nature of the awe experience, assessed the intensity of awe and awe-related emotions, and collected measures of self-diminishment and wellbeing.

### **Study 1**

The goal of Study 1 was to examine the impact of shared experience on awe as well as the impact of awe on wellbeing and self-diminishment. Participants completed an online survey in which they described a time when they felt awe either as a shared or an individual experience, and rated the intensity of that experience. Participants then completed a number of self-reports measures that assessed awe intensity and awe-related emotions, self-diminishment (humility, small-self perceptions), and wellbeing (satisfaction with life, meaning in life, daily gratitude, subjective happiness).

By asking participants to retrieve memories of and describe experiences with awe, we were able to capture real-life awe experiences that were personally meaningful. It also allowed us to explore a broad range of awe experiences.

## **Hypotheses and Research Questions**

### ***Exploring the Impact of Shared Experience***

**Research Question I.** Do individual and collective experiences with awe differ in intensity? That is, will awe intensity ratings differ as a function of individual versus shared recall narrative?

**Research Question II.** Do individual and collective awe experiences differ in the extent to which they elicit awe-related emotions? That is, will awe-related emotion ratings differ as a function of individual versus shared recall narrative?

**Research Question III.** If awe is associated with self-diminishment and wellbeing, does the strength of the associations differ as a function of whether the awe experience is individual or shared?

### ***Testing the Relationships between Awe, Self-Diminishment, and Wellbeing***

**Hypothesis I.** Participants with higher awe intensity ratings will score higher on humility and small-self perceptions than participants with lower awe intensity scores.

**Hypothesis II.** Participants with higher awe intensity ratings will score higher on satisfaction with life, meaning in life, gratitude, and subjective happiness than participants with lower intensity scores.

**Hypothesis III.** Participants with higher awe-related emotion scores will score higher on humility and small-self perceptions than participants with lower awe-related emotion scores.

**Hypothesis IV.** Participants with higher awe-related emotion scores will score higher on satisfaction with life, meaning in life, gratitude, and subjective happiness than participants with lower awe-related emotion scores.

**Research Question IV.** If awe is associated with self-diminishment and wellbeing, does self-diminishment mediate the relationship between awe and wellbeing?

***Other Exploratory Questions***

**Research Question V.** What is the typical valence of awe experiences: positive, negative, or ambivalent? Does this vary as a function of whether the awe experience is individual or shared?

**Research Question VI.** What is more likely to elicit awe? Does this vary as a function of whether the awe experience is individual or shared?

**Method**

***Participants and Design***

Participants were 432 undergraduate students ( $M_{\text{age}} = 20.1$  years, range = 18–48 years) at DePaul University enrolled in the Psychology Subject Pool, compensated with partial course credit. Those who disclosed their demographic characteristics and whose data were used in the final data analysis (exclusions detailed in *Results* below) included 260 women, 77 men, 6 non-binary, 2 other gender; the racial breakdown was 2 Black, 11 East Asian, 18 Indigenous, 58 LatinX, 5 Middle Eastern, 25 South Asian, 164 White, and 45 multiracial. The study used a single-factor (Experience: individual, shared) between-subjects design.

Boothby et al. (2014) report Cohen's  $d$ s ranging from 0.34 to 0.59 for the effect of shared experience on enjoyment. Stellar et al. (2017) report  $r(92) = .22, p = .04$  for the association between self-reported dispositional awe and peer-rated humility. Moreover, our unpublished data suggest significant correlations between self-reported awe and wellbeing ranging from .08 to .27. Thus, the current evidence is variable, suggesting

small to large effect sizes. Adopting a Cohen's  $f$  of 0.25 to reflect an expected medium-sized effect, G\*Power indicates a total  $N = 159$  to detect a medium-sized effect in a two-condition design with a desired power of 0.80. As a result, the planned sample size was 400 total participants with 200 in each condition, to allow for data loss. The final sample size was 359 total participants with 170 participants in the individual condition (128 for random sample) and 189 participants in the shared condition (104 for random sample). Seventy-three additional participants completed the study, but their data were unusable because they failed to write a narrative.

In accordance with IRB requirements, all participants received information on the study procedure prior to participating. Following the completion of all tasks, participants were debriefed and compensated accordingly.

### ***Procedure***

Participants were recruited through the online experiment management system (<http://depaul.sona-systems.com>), where they signed up for an online study on the nature of awe. The study was administered and the data collected via Qualtrics survey.

Participants learned that the research study was designed to investigate the relationship between awe experiences and personality. Participants were provided with a definition of awe, as follows: “the feeling that you get in the presence of something so overwhelming that it is hard to fully understand or appreciate.” Participants were then asked to indicate (1) whether they could think of a time when they felt awe when they were by themselves, (2) whether they could think of a time when they felt awe when at least one other person was present, and (3) whether they couldn't think of a time when they felt awe. Participants who indicated that they could think of both individual and

shared experiences were randomly assigned to narrative condition (individual awe, collective awe); participants who indicated that they could think of only one type of experience were assigned to the associated narrative condition. Participants who reported not being able to recall an awe experience were redirected to a page that terminated their participation.

Participants then wrote about their assigned awe experience, before completing a number of self-report measures (detailed below) assessing awe and related emotions, self-diminishment, and wellbeing.

The measures took approximately 20 minutes to complete.

### ***Materials and Measures***

Study instructions are presented in Appendix A; measures are presented in Appendix B.

**Individual versus Collective Experience Manipulation.** Participants wrote about their assigned awe experience in response to the following prompt:

Take a minute to think back on a time when you felt awe and you were by yourself [and at least one other person was present]. Write about it in as much detail as you can remember, to really relive the experience. We will be coding your narrative for how well it describes the experience/event and evokes the emotion.

Participants in the shared narrative condition then reported the number of people present, identified who the people were and what their relationship was to them, and whether they were aware of the presence of others in the moment.

**Awe Intensity and Valence.** Participants indicated how intensely they experienced awe, along a 5-point scale anchored by 1, *not at all*, to 5, *extremely*. They then rated how positive and negative the experience was, along a 5-point scale anchored by 1, *not at all*, to 5, *extremely*; item order was randomized.

**Awe-Related Emotions.** Participants rated the extent to which they experienced other awe-related emotions during the experience relayed in the narrative. They rated the extent to which they experienced positive (*amazement, inspiration, wonder*) and negative (*anxiety, dread, and fear*) awe-related emotions along a 7-point scale anchored by 0, *not at all*, to 6, *extremely*. Item order was randomized.

**Categorization of Awe Elicitor.** Participants identified what elicited the feeling of awe (adapted from Stellar et al., 2017). Participants were provided with a checklist with the following options: *nature, technology, a work of art or creative act, an individual's talent, skill, or accomplishment, and other (specify:)*.

**Self-Diminishment.** Participants responded to two measures of self-diminishment. Measure presentation order was randomized.

**Humility.** Adapted from Stellar et al. (2017), participants were asked to consider for a moment all of their achievements and accomplishments. Following this prompt, participants responded to three items, along a 7-point scale anchored by 0 (*not at all*) and 6 (*completely*): “To what extent have you contributed to your achievements/accomplishments?”, “To what extent have other people contributed to your achievements/accomplishments?”, and “To what extent have external forces (God or luck) contributed to your achievements/accomplishments?”. Item order was randomized.

***Small-Self Perceptions.*** Participants completed a small-self scale (Bai et al., 2017). They rated the extent to which they agreed with two statements along a 7-point scale anchored by 1, *not at all*, to 7, *completely*: “In general, I feel relatively small” and “In general, I feel insignificant”. Next, they responded to three items (presented in random order) that each comprised seven images of increasing size: circles (“Which of the following circles best represents how big or small you feel about yourself?”), stick figures (“Which of the following drawings best represents you?”), and cursive script (“Looking at the drawing you selected in the question above, which of the following signatures would most closely resemble your own?”).

***Wellbeing.*** Participants responded to four measures of wellbeing, including satisfaction with life, meaning in life, gratitude, and subjective happiness. Measure presentation order was randomized

***Satisfaction with Life.*** Participants completed the satisfaction with life scale (Diener, Emmons, Larsen, & Griffin, 1985). Participants rated the extent to which each of five statements was true or accurate for them, along a 7-point scale anchored by 1, *not at all*, to 7, *completely*. An example item is “In most ways my life is close to my ideal”.

***Meaning in Life.*** Participants completed the *meaning in life questionnaire* (Steger, Frazier, Oishi, & Kaler, 2006). They rated the extent to which each of 10 statements was true or accurate for them. The scale had two subscales: presence of meaning in life (e.g., “My life has no clear purpose”, reverse-scored) and search for meaning in life (e.g., “I am seeking a purpose or mission for my life”).

***Daily Gratitude.*** Participants completed the daily gratitude questionnaire (McCullough, Emmons, & Tsang, 2002). They rated the extent to which each of six

statements was true or accurate for them, along a 7-point scale anchored by 1, *not at all*, to 7, *completely*. Sample items include “I have so much to be thankful for” and “Long amounts of time can go by before I feel grateful to something or someone” (reverse-scored).

***Subjective Happiness.*** Participants completed the subjective happiness scale (Lyubomirsky & Lepper, 1999). The 4-item scale includes statements such as “In general I consider myself...”, rated along a 7-point scale anchored by *not a very happy person* and *a very happy person*.

**Demographic Variables.** Participants reported their gender, race/ethnicity, and age.

## Results

### ***General Analytic Strategy***

Based on their self-reported ability to recall both individual and collective awe experiences, participants were either randomly assigned to recall individual or collective experiences (if they reported being able to recall both) or self-selected into a narrative condition. Each participant was coded according to the following: 1 = randomly assigned to individual narrative, 2 = randomly assigned to collective narrative, 3 = self-selected to individual narrative, 4 = self-selected to collective narrative.

A high proportion ( $n = 127$ , 35.4%) of respondents reported being unable to recall both individual and collective awe experiences; these participants could not be randomly assigned to recall condition. As a result, the final sample of randomized participants ( $N = 232$ ) was smaller than needed for adequate power. Acknowledging that the lack of randomization across the full sample limits the ability to make strong causal inferences,



results are presented here for the full sample ( $N = 359$ ), to capitalize on the greater statistical power. We report the analyses with the randomized sample in Appendix B, in line with our pre-registered analysis plan (<https://osf.io/3h6bt>). All analyses were conducted using jamovi analysis software (v. 1.6; the jamovi project, 2021).

### ***Preliminary Analyses***

Each record was checked to identify participant noncompliance. For example, the records were checked for participants who may have chosen the same response option for every item on a measure. This type of response suggests noncompliance, but none were found. Records of participants who did not complete the entire experiment were omitted from analysis ( $n = 22$ ). Participant records without narratives were also omitted from analysis ( $n = 73$ ). Missing data points were left blank, and analyses used pairwise deletion.

### ***Data Reduction***

**Exploratory Factor Analyses.** An exploratory factor analysis (EFA) using oblimin rotation was conducted to identify any underlying structure to awe-related emotion ratings (*amazement, inspiration, wonder, anxiety, fear, dread*). Parallel analysis, eigenvalues (number of factors with values  $> 1$ ), and scree plot (number of factors to the left of the “elbow”) were used as basis for identifying number of factors to retain; these indices suggested a two-factor solution. An item was assigned to a factor if the factor loading  $> .4$  and the item did not also load onto another factor; all items were retained. As indicated in Table 1, the two factors reflected positive awe-related emotion (*amazement, inspiration, wonder*) and negative awe-related emotion (*anxiety, dread, fear*). Subscale scores were calculated by averaging across the relevant items.

**Table 1**  
**Exploratory Factor Analyses, Full Sample, Study 1**

Measure	Factor	Items	Factor Loading	Eigenvalue	% Variance	Cumulative %	$\chi^2 (p)$	TLI	RMSEA
Awe-related emotion	Negative emotion	Anxiety	.86						
		Dread	.70						
		Fear	.93	2.15	35.8	35.8	4.37 (.36)	0.998	0.016
	Positive emotion	Amazement	.78						
		Inspiration	.61						
		Wonder	.50	1.27	21.2	57	4.37 (.36)	0.998	0.016
Humility*	Other people	Other people	1.00						
				1.1	36.5	36.5			
	External factors	External factors	.31	1.1	36.5	36.5	1.26	-Inf	-

*Note.* We followed Hu and Bentler's (1999) conventions for good model fit, and accepted models that met at least two of the following criteria: non-significant  $\chi^2$ , TLI > .95, and RMSEA < .06. \* The *Self* item failed to load onto a factor.

**Confirmatory Factor Analyses.** Confirmatory factor analyses (CFAs) were conducted for each of the outcome measures (humility, small-self-perceptions, satisfaction with life, meaning in life, subjective happiness, daily gratitude) to test whether responses conformed to the hypothesized structure. Measures were scored according to conventional use (i.e., averaged across individual ratings) if the majority of fit indices were acceptable for each scale, according to the following criteria: RMSEA < .06, CFI > .9, and SRMR < .08 (following Hu & Bentler, 1999). As indicated in Table 2, the small-self perceptions, satisfaction with life, meaning in life (two-factor), subjective happiness, and daily gratitude scales all met at least two of three criteria.

The analysis failed to converge for the humility scale, so we conducted an EFA to identify an underlying structure. The humility EFA failed to yield meaningful factors, so we elected to analyze the items separately.

**Table 2**  
***Confirmatory Factor Analyses, Full Sample, Study 1***

Measure	RMSEA	CFI	SRMR
Humility*	NA	NA	NA
Small-Self Perceptions	0.23	0.90	0.06
Satisfaction with Life	0.005	1.00	0.01
Meaning in Life	0.09	0.96	0.06
Subjective Happiness	0.00	1.00	0.005
Daily Gratitude	0.08	0.98	0.04

*Note.* Following Hu and Bentler (1999), we ascribed good model fit to measures that met at least two of the following criteria: RMSEA < .06, CFI > .9, and SRMR < .08. \*The model failed to converge.

### *Exploring the Impact of Shared Experience*

Overall descriptives (means, SDs, measure reliability, and inter-measure correlations) are presented in Table 3. Descriptive statistics for all measures as a function of narrative condition are presented in Table 4.

**Awe Intensity and Awe-Related Emotions as a Function of Individual versus Collective Experience.** Participants' awe intensity ratings and awe-related emotion scores were examined separately using two-tailed *t*-tests as a function of narrative condition (individual awe, collective awe). As shown in Table 4, only awe intensity differed reliably as a function of narrative condition, with participants in the shared-experience condition reporting higher awe intensity scores than participants in the individual-experience condition.

**Awe and Self-Diminishment as a Function of Individual versus Collective Experience.** As shown in Table 3, awe intensity correlated with small-self perceptions—but in the opposite direction expected, with greater awe intensity being associated with less self-diminishment. We examined whether this association<sup>1</sup> differed as a function of narrative condition using an online calculator (<https://www.psychometrica.de/correlation.html>) to conduct a Fisher *r*-to-*z* transformation and a two-tailed independent-samples *z*-test. The analysis did not yield an effect of narrative condition on the awe intensity–small-self perceptions association,  $z = 0.203, p = .42$ .

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<sup>1</sup> We originally planned to analyze the relationships between awe and both self-diminishment measures (i.e., small-self perceptions and humility) as a function of narrative condition, but the remaining zero-order correlations were not significant.

**Table 3**  
*Scale Descriptives and Inter-Scale Correlations. Full Sample, Study 1*

	<i>M</i>	<i>SD</i>	<i>α</i>	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Awe intensity	4.90	1.12	—	—												
2. Positive valence	5.09	1.62	—	.23***	—											
3. Negative valence	0.71	1.55	—	.03	.81***	—										
4. Positive awe-related emotion	4.65	1.22	.63	.23***	.68***	.52***	—									
5. Negative awe-related emotion	1.31	1.62	.87	.03	.58***	.58***	.38***	—								
6. Humility – self	1.10	1.11	—	.09	.03	.01	.02	.05	—							
7. Humility – other people	3.66	1.26	—	.03	.06	.08	.02	.11*	.05	—						
8. Humility – external factors	3.36	1.72	—	.003	.03	.04	.05	.06	.04	.31***	—					
9. Small-self perceptions	2.61	1.32	.86	.11*	.09	.11*	.02	.03	.25***	.03	.11	—				
10. Satisfaction with life	3.26	1.30	.84	.009	.03	.007	.03	.02	.17***	.15**	.12*	.45***	—			
11. Presence of meaning in life	3.47	1.43	.87	.05	.03	.11*	.04	.08	.12*	.09	.19***	.52***	.53***	—		
12. Search for meaning in life	3.83	1.55	.91	.10	.06	.09	.13*	.05	.006	.09	.11*	.17**	.10	.13*	—	
13. Subjective happiness	3.39	1.33	.86	.09	.05	.04	.07	.04	.20***	.14**	.17**	.55***	.56***	.53***	.05	—
14. Daily gratitude	4.74	1.02	.82	.03	.08	.009	.08	.03	.23***	.24***	.13	.30***	.54***	.39***	.09	.47***

*Note.* For all scales and subscales, possible range = 0 to 6. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$  (uncorrected for multiple comparisons).

**Table 4**  
***Descriptive and Inferential Statistics as a Function of Narrative Condition, Full Sample, Study 1***

	Individual			Shared			<i>t</i>	<i>p</i>	Cohen's <i>d</i>	BF <sub>01</sub>
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>				
Awe intensity	4.77	1.23	163	5.02	1.01	181	2.06	.04	0.22	NA
Positive valence	5.01	1.59	161	5.17	1.64	181	0.91	.36	0.10	5.62
Negative valence	0.80	1.55	163	0.63	1.54	180	1.05	.29	0.11	4.93
Positive awe-related emotion	4.68	1.14	160	4.64	1.29	180	0.32	.75	0.03	7.95
Negative awe-related emotion	1.37	1.62	163	1.25	1.67	179	0.69	.49	0.07	6.66
Small-self perceptions	2.59	1.29	162	2.62	1.36	180	0.19	.85	0.02	8.22
Presence of meaning in life	3.49	1.53	161	3.45	1.34	179	0.26	.80	0.03	8.06
Search for meaning in life	3.97	1.60	163	3.69	1.50	178	1.67	.10	0.18	2.19
Satisfaction with life	3.30	1.35	162	3.22	1.25	179	0.64	.53	0.07	6.89
Subjective happiness	3.51	1.38	163	3.28	1.27	179	1.62	.11	0.18	2.36
Daily gratitude	4.66	1.14	104	4.81	0.91	129	1.09	.28	0.14	3.99
Humility – self	0.94	1.06	163	1.23	1.14	180	2.42	.07	0.26	0.51
Humility – other people	3.65	1.32	163	3.68	1.21	180	0.20	.84	0.02	8.22
Humility – external factors	3.50	1.70	163	3.24	1.74	180	1.42	.16	0.15	3.18

*Note.* Possible range = 0 to 6. Following Jeffreys (1961), we interpret BF<sub>01</sub> as follows: BF<sub>01</sub> < 3 = unclear evidence; 3 < BF<sub>01</sub> < 10 = moderate evidence for the null hypothesis; BF<sub>01</sub> > 10 = strong evidence for the null hypothesis.

We also conducted a moderated regression analysis using the MedMod plug-in. The moderating effect of narrative condition was not statistically significant ( $p = .564$ ). The direct effect of awe intensity was statistically significant ( $p = .027$ ), but the effect of narrative condition was not statistically significant ( $p = .651$ ).

### **Awe and Wellbeing as a Function of Individual versus Collective Experience.**

As shown in Table 3, positive awe-related emotions correlated with search for meaning in life. As expected, greater positive awe-related emotion scores were associated with greater search for meaning in life. We examined whether this association<sup>2</sup> differed as a function of narrative condition using an online calculator (<https://www.psychometrica.de/correlation.html>) to conduct a Fisher  $r$ -to- $z$  transformation and a two-tailed independent-samples  $z$ -test. The analysis did not yield an effect of narrative condition on the positive emotion–search for meaning in life association,  $z = 0.55$ ,  $p = .29$ .

We also conducted a moderated regression analysis using the jamovi MedMod plug-in module. The moderating effect of narrative condition was not statistically significant ( $p = .449$ ). The direct effect of positive awe-related emotions was statistically significant ( $p = .013$ ), but the effect of narrative condition was not statistically significant ( $p = .079$ ).

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<sup>2</sup> We originally planned to analyze the relationships between awe and all four wellbeing measures (i.e., satisfaction with life, meaning in life, subjective happiness, daily gratitude) as a function of narrative condition, but the remaining zero-order correlations were not significant.

### ***Testing the Relationships between Awe, Self-Diminishment, and Wellbeing***

**Awe, Awe-Related Emotions, and Hypothesized Outcomes.** As depicted in Table 3, the correlational analysis indicated that awe intensity correlated with small-self perceptions and that small-self perceptions correlated with all wellbeing measures.<sup>3</sup>

**Self-Diminishment as a Mediator between Awe and Wellbeing.** Although the results did not yield reliable zero-order correlations between awe intensity and wellbeing, it was associated with small-self perceptions, which were themselves associated with each of the wellbeing measures. Because indirect effects are possible in the absence of direct effects (Rucker et al., 2011), we explored<sup>4</sup> the role of self-diminishment as a mediator between awe and wellbeing, separately for each of the five<sup>5</sup> wellbeing measures.

Results are presented in Table 5. We found significant indirect effects of awe intensity on wellbeing through small-self perceptions for several measures (satisfaction with life,  $p = .048$ ; presence of meaning in life,  $p = .043$ ; and subjective happiness,  $p = .042$ ).

### ***Additional Exploratory Analyses***

**Awe Experience Valence.** As shown in Table 4, participants reported that their awe experiences were more positive than negative; a paired-samples  $t$ -test indicated that this effect was significant,  $t(340) = 27.10, p < .001$ .

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<sup>3</sup> Our original analysis plan called for follow-up regression analyses to determine which aspects of awe and which forms of self-diminishment best predicted wellbeing. These analyses were no longer applicable given that only one awe measure and only one self-diminishment measure yielded significant correlations.

<sup>4</sup> This is a deviation from the original analysis plan, because we were unaware of the possibility of indirect effects in the context of no direct effect.

<sup>5</sup> We analyzed presence of meaning and search for meaning separately.



**Table 5**  
***Mediation of Awe Intensity–Wellbeing Relationship by Small-Self Perceptions, Full Sample, Study 1***

Criterion Measure		Estimate	Effect	Estimate	SE	Z	p
Satisfaction with Life							
	Mediation		Indirect	0.06	0.03	1.98	.05
			Direct	-0.05	0.06	-0.8	.40
			Total	0.01	0.06	0.17	.87
	Path		Awe intensity → Small self	-0.13	0.06	-2	.04
			Small self → Life satisfaction	-0.45	0.05	-9.4	<.001
			Awe intensity → Life satisfaction	-0.05	0.07	-0.8	.40
Presence of Meaning							
	Mediation		Indirect	0.07	0.04	2.02	.04
			Direct	-0.01	0.06	-0.2	.87
			Total	0.06	0.07	0.93	.35
	Path		Awe intensity → Small self	-0.13	0.06	-2.1	.04
			Small self → Presence	-0.56	0.05	-11	<.001
			Awe intensity → Presence	-0.01	0.06	-0.2	.87
Search of Meaning							
	Mediation		Indirect	-0.03	0.01	-1.7	.09
			Direct	-0.11	0.07	-1.5	.13
			Total	-0.14	0.07	-1.8	.07
	Path		Awe intensity → Small self	-0.13	0.06	-2.1	.04
			Small self → Search	0.19	0.06	3.07	.002
			Awe intensity → Search	-0.11	0.07	-1.5	.13
Subjective Happiness							
	Mediation		Indirect	0.07	0.04	2.03	.04
			Direct	0.03	0.05	0.56	.57
			Total	0.10	0.06	1.60	.11
	Path		Awe intensity → Small self	-0.13	0.06	-2.1	.04
			Small self → Happiness	-0.55	0.05	-12	<.001
			Awe intensity → Happiness	0.03	0.05	0.56	.57
Daily Gratitude							
	Mediation		Indirect	0.02	0.02	1.08	.28
			Direct	0.01	0.06	0.16	.87
			Total	0.03	0.06	0.48	.63
	Path		Awe intensity → Small self	-0.08	0.07	-1.1	.27
			Small self → Gratitude	-0.24	0.05	-4.8	<.001
			Awe intensity → Gratitude	0.01	0.06	0.16	.87

*Awe Experience Valence<sup>6</sup> as a Function of Individual versus Collective*

**Experience.** Participants' ratings of how positive and negative their awe experience was was analyzed using a 2 (Narrative: individual, collective)  $\times$  2 (Valence: positive, negative) mixed-model ANOVA with narrative condition as a between-participants factor. As shown in Table 4, participants' ratings did not differ as a function of narrative condition.<sup>7</sup>

**Characteristics of Awe Elicitors.** Frequencies were calculated to explore whether awe is more likely to be elicited by some types of experiences versus others. In descending order, participants reported that awe was elicited by the following: nature, 52.6% of narratives; accomplishment, 34.5%; art/creativity, 26.2%; technology, 11.4%. "Other" was selected for 22.6% of narratives.

*Characteristics of Awe Elicitors as a Function of Individual versus Collective*

**Experience.** For each category of elicitor, we conducted a chi-square analysis to explore whether individual versus shared experience was associated with elicitor type. As shown in Table 6, no differences emerged.

**Table 6**  
*Elicitor Frequencies (Percentage of Total) as a Function of Narrative Condition, Full Sample, Study 1*

	Individual	Shared	Chi-square	<i>p</i>
Nature	92	97	0.28	.60
Technology	16	25	1.29	.26
Work of art or creative act	42	52	0.37	.55
Individual talent, skill, or accomplishment	63	61	0.91	.34
Other	36	45	0.36	.55

<sup>6</sup> Deviating from the original plan, we elected not to calculate and analyze emotion ambivalence given the lack of effects for the individual valence items.

<sup>7</sup> We originally proposed to analyze valence using multivariate ANOVA to control for shared variance. However, this argument for using MANOVA has been challenged (Huang, 2020; Huberty & Morris, 1992).

## Discussion

In the current study, participants were asked to write about a time they felt awe either as a shared or an individual experience. After writing about their awe experience, they rated the intensity of the awe experience and awe-related emotions in addition to completing self-report measures that assessed self-diminishment (humility, small-self perceptions) and wellbeing (satisfaction with life, meaning in life, daily gratitude, subjective happiness).

### *Effects of Shared Experience*

The effect of shared experience on awe was examined with two self-report measures: awe intensity and awe-related emotions. We found that participants in the shared recall narrative reported higher awe intensity scores than participants in the individual recall narrative. However, awe-related emotion ratings did not differ as a function of individual versus shared recall narrative, and the Bayes factors (see Table 4) provided moderate evidence for the null, that shared and individual experiences did not differ. Given that we found an effect for shared versus individual experience for only one of three measures and moderate evidence for the null on the other measure, this research question does not have a clear answer.

### *Awe and Self-Diminishment*

The impact of awe on self-diminishment was examined using several self-report measures: a five-item small-self perceptions measure, and three items assessing humility. Contrary to predictions and what previous literature suggests (Stellar, Gordon, Anderson et al., 2017; Piff et al., 2015; Campos et al., 2013), the results indicated that participants with higher awe intensity ratings scored lower on small-self perceptions than participants

with lower awe intensity scores. Awe intensity did not correlate with humility, and for two of the three humility items, the Bayes factors suggested moderate evidence for the null hypothesis.

Although awe intensity was associated with small-self perceptions, the strength of the association did not differ as a function of individual versus shared recall narrative. This answers our research question about the effects of shared experience on the awe-self-diminishment relationship, but there should be further exploration due to the conflicting findings with the awe–self-diminishment associations.

### ***Awe and Wellbeing***

We examined the relationships between awe and wellbeing using five measures: satisfaction with life, presence of meaning in life, search for meaning in life, daily gratitude, and subjective happiness. In general, we found very little evidence for an association between awe and wellbeing. Awe intensity did not correlate with any of the measures, and the Bayes factors for three of the five measures suggested moderate evidence for the null hypothesis (with unclear evidence for the remaining two). Associations between awe-related emotions were mostly nonsignificant, with one exception: Positive awe-related emotion did predict search for meaning in life. Thus, there is limited support overall for the hypothesized awe–wellbeing relationship in that we only found effects on one of five measures, and then only for one of three measures of awe.

Considering the one positive association among the many null associations leads to two possibilities. First, awe may not be related to wellbeing as the literature suggests (Van Cappellen et al., 2016; Rudd et al., 2012; Van Cappellen & Saroglou, 2012; Stellar,

Gordon, Piff et al., 2017; Steger et al., 2006 ). Second, awe may be related to wellbeing, but in very specific ways. As for the awe-search for meaning relationship, search for meaning may be a response to the need for accommodation appraisal that is required for an awe experience (Keltner & Haidt, 2003); the remaining wellbeing measures do not map as clearly onto the definition of awe or its requisite appraisals. This suggests that a more detailed theory is required.

Although positive awe-related emotion was associated with search for meaning in life, the strength of the association did not differ as a function of individual versus shared recall narrative. This answers our research question about the effects of shared experience on the awe-wellbeing relationship, but there should be further exploration due to the limited support for the hypothesized awe-wellbeing relationship.

### ***Self-Diminishment as Mediator***

Results indicated that small-self perceptions mediated the relationships between awe intensity and satisfaction with life, presence of meaning in life, and subjective happiness. This provides moderate evidence for self-diminishment as a mediator. Small-self perceptions, versus humility, may mediate the relationship between awe and wellbeing because being uncharacteristically less aware of the self allows an individual to feel more connected to the world around them and less aware of what may typically trouble them (Shiota et al., 2007).

It is important to note, however, that small-self perceptions did not mediate the relationships between awe intensity and search for meaning in life or daily gratitude. Moreover, humility, another form of self-diminishment, was not tested as a potential mediator because there was no evidence of associations between humility and wellbeing.

Self-diminishment has been suggested as a mediator for the awe–humility relationship (Stellar, Gordon, Anderson et al., 2017) and, indeed, small-self perceptions correlated positively with the *self* humility item. Still, humility did not predict wellbeing, contrary to predictions.

## Study 2

The goal for Study 2 was to further explore aspects of the awe experience in a more controlled experimental setting. Study 1 relied on participants' memory for awe-inducing experiences, which had the benefit of maximizing personal relevance. However, remembered events might have less impact than experienced events, and differences across participants in the types or vividness of events remembered might introduce extraneous noise into the analysis. In Study 2, participants watched either an awe-inducing nature video or a baseline nature video, either alone (individual condition) or with a housemate (shared condition). They then rated how intensely they felt awe and awe-related emotions, and reported on their feelings of self-diminishment and wellbeing. In adding control, we sought to equate emotional impact across participants and to reduce noise.

## Hypotheses and Research Questions

**Hypothesis I.** There will be a main effect of video condition, such that participants in the individual and shared awe conditions will report higher awe intensity than participants in the baseline conditions.

**Hypothesis II.** There will be a main effect of video condition, such that participants in the individual and shared awe conditions will report higher awe-related emotion than participants in the baseline conditions.

### ***Exploring the Impact of Shared Experience***

**Research Question I.** Do individual and collective experiences with awe differ in intensity? That is, will awe intensity ratings differ between the individual versus shared experience conditions?

**Research Question II.** Do individual and collective awe experiences differ in the extent to which they elicit awe-related emotions? That is, will awe-related emotion ratings differ between the individual versus shared experience conditions?

**Research Question III.** If awe is associated with self-diminishment and wellbeing, does the strength of the associations differ as a function of whether the awe experience is individual or shared?

### ***Testing the Relationships between Awe, Self-Diminishment, and Wellbeing***

**Hypothesis III.** There will be a main effect of video condition, such that participants in the individual and shared awe conditions will score higher on humility and small-self perceptions than participants in the baseline conditions.

**Hypothesis IV.** There will be a main effect of video condition, such that participants in the individual and shared awe conditions will score higher on satisfaction with life, meaning in life, and subjective happiness than participants in the baseline conditions.

**Research Question IV.** If awe is associated with self-diminishment and wellbeing, does self-diminishment mediate the relationship between awe and wellbeing?

## Method

### *Participants and Design*

Participants were 295 undergraduate students ( $M_{\text{age}} = 19.6$  years, range = 17–37 years) at DePaul University enrolled in the Psychology Subject Pool, compensated with partial course credit. Those who disclosed their demographic characteristics and whose data were used in the final data analysis (exclusions detailed in *Results* below) included 159 women, 76 men, and 2 non-binary; the racial breakdown was 10 Black, 7 East Asian, 39 LatinX, 6 Middle Eastern, 1 Pacific Islander, 20 South Asian, 114 White, and 35 multiracial. The study used a 2 (Video: awe, baseline)  $\times$  2 (Experience: individual, shared) between-subjects design.

Relying on the same power analysis as in Study 1, the planned sample size was 240 participants ( $n = 80$  per condition). The actual sample size was 238 participants (individual baseline,  $n = 77$ ; shared baseline,  $n = 40$ ; individual awe,  $n = 77$ ; shared awe,  $n = 44$ ). The imbalance across conditions was due to a relatively low number of participants reporting having someone available to watch the video with them.. Fifty-seven additional participants completed the study, but their data were unusable due to failing the attention check and/or the manipulation check.

In accordance with IRB requirements, all participants received information on the study procedure and provided informed consent prior to participating. Following the completion of all tasks, participants were debriefed and compensated accordingly.



### ***Procedure***

Participants were recruited through the online experiment management system (<http://depaul.sona-systems.com>), signing up for a study on momentary wellbeing and living status. The study was administered and data collected via Qualtrics survey.

Participants learned that the research study was designed to investigate the impact of shared living. Participants were asked to indicate whether there was someone else available to watch a video with them; participants' responses determined their subsequent individual/shared experience categorization. Participants were then randomly assigned to video condition (baseline versus awe)). Participants in the shared experience conditions were prompted to ask their housemate to leave once the video was completed, and to complete the rest of the study alone. Finally, participants completed a number of self-report measures (detailed below) assessing awe and related emotions, self-diminishment, and wellbeing. The measures took approximately 20 minutes to complete.

### ***Materials and Measures***

**Individual versus Collective Experience.** Participants who self-selected into the shared-experience conditions watched a video with a housemate. Participants who self-selected into the individual-experience conditions) watched a video alone. Participants were told, "The purpose of the video is to create a baseline condition that cancels out the random variation between different participants and different types of households, having everyone begin the survey from the same psychological starting point." Participants in the individual experience conditions were instructed to ensure that they were able to watch the video entirely alone, and participants in the shared experience conditions were

instructed to ensure that a housemate was watching with them. All participants were instructed to watch the entire video in full screen and with the sound on.

**Video Manipulation.** Participants watched either a video intended to induce awe or a baseline video intended to induce positive affect but not awe. The awe-inducing video (5:19 in length) was a time-lapse video that depicted landscape scenes of mountains, waterfalls, and the sky that dynamically shifted in scope from close-up to far away to convey vastness (a known elicitor of awe; Keltner & Haidt, 2003). The video also had a musical soundtrack with similar “scope” shifts (e.g., in loudness and intensity, presence of crescendos, and sudden changes in dynamics). The baseline video (4:34 in length) also depicted nature scenes (landscape scenes of open fields, and close-up shots of animals, flowers, and leaves), but without the visual or auditory dynamism known to heighten the experience of awe.

**Awe Intensity and Awe-Related Emotions.** Participants completed the same measures as in Study 1, with the exception that the awe valence items were omitted because the videos were known, based on past use, to induce positive emotion.

**Self-Diminishment.** Participants completed the same measures as in Study 1.

**Wellbeing.** Participants complete the same satisfaction with life, meaning in life, and subjective happiness measures as in Study 1.

**Manipulation Check.** Participants responded to two questions to assess their understanding of the manipulations. They identified which video they watched by selecting one of the following options: “*I watched the nature video that depicted mountains*” (awe-inducing video), “*I watched the nature video that depicted farmland*” (baseline video), or “*I can’t remember which video I watched.*” They identified whether

they were in the individual or the shared condition by selecting one of the following options: *“I watched the video alone”* (individual condition), *“I watched the video with another person”* (shared condition), or *“I can’t remember whether I watched the video alone or with someone else.”*

**Connectedness with Housemate.** Participants in the shared-experience conditions indicated whom they watched the video with. They then rated the extent to which they felt connected to this person while watching the video as well as how connected they felt to this person normally along a 7-point scale anchored by 0, *not at all*, to 6, *very much*.

**Demographic Variables.** Participants reported the same information as in Study 1.

**Attention Check.** Participants responded to one question to assess their attentiveness throughout the study. They identified whether they were attentive by selecting one of the following options: *“I followed the instructions and was careful and attentive; you may keep my data”* (attentive), or *“I did not follow the instructions / I was distracted; you should delete my data”* (not attentive).

## **Results**

### ***General Analytic Strategy***

Based on their self-reported ability to have another person watch a video with them, participants were categorized as having watched a video alone or with a household member. Participants were randomly assigned to watch either the awe video or the baseline video.

Unless otherwise stated, participants' responses were examined using 2 (Video: baseline, awe)  $\times$  2 (Experience: individual, shared) ANOVAs. Results are presented for the full sample ( $n = 295$ ), in line with our preregistered analysis plan (<https://osf.io/3h6bt>). All analyses were conducted using jamovi analysis software (v. 1.6; the jamovi project, 2021).

### ***Preliminary Analyses***

Each record was checked to identify participant noncompliance. For example, the records were checked for participants who may have chosen the same response option for every item on a measure. This type of response suggests noncompliance, but none were found. Records of participants who did not complete the entire experiment were omitted from analysis ( $n = 41$ ). Participants who failed the attention check ( $n = 49$ ) or the manipulation check ( $n = 49$ ) were also omitted from analysis; due to overlap between the two exclusion criteria, 57 participants in total were omitted. Missing data points were left blank, and analyses used pairwise deletion.

### ***Data Reduction***

**Exploratory Factor Analyses.** We followed the same procedure as in Study 1. Results indicated the same two-factor solution and all items were retained (see Table 7).

**Table 7**  
**Exploratory Factor Analyses, Study 2**

Measure	Factor	Items	Factor Loading	Eigenvalue	% Variance	Cumulative %	$\chi^2 (p)$	TLI	RMSEA
Awe-related emotion*	Negative emotion	Anxiety	.80	1.22	20.4	54.5	4.28 (.37)	0.997	0.017
		Fear	.65						
	Positive emotion	Amazement	.87	2.05	34.1	34.1	4.28 (.37)	0.997	0.017
		Inspiration	.80						
		Wonder	.80						
Humility**	Other people	Other people	1.00	1.02	34.1	34.1	0.11	-Inf	-
Small-self perceptions		Small	.69	2.37	47.5	47.5	71.0 (< .001)	0.69	0.23
		Insignificant	.48						
		Circle	.84						
		Body	.69						
		Signature	.70						

*Note.* We followed Hu and Bentler's (1999) conventions for good model fit, and accepted models that met at least two of the following criteria: non-significant  $\chi^2$ , TLI > .95, and RMSEA < .06. \* The *Dread* item failed to load onto a factor. \*\* Both the *Self* and *External* items failed to load onto a factor.

**Confirmatory Factor Analyses.** We followed the same procedure as in Study 1 and the analyses yielded similar results (see Table 8).

**Table 8**  
***Confirmatory Factor Analyses, Study 2***

Measure	RMSEA	CFI	SRMR
Humility*	NA	NA	NA
Small-Self Perceptions	0.24	0.85	0.08
Satisfaction with Life	0.10	0.98	0.02
Meaning in Life	0.07	0.97	0.05
Subjective Happiness	0.00	1.00	0.009

*Note.* Following Hu and Bentler (1999), we ascribed good model fit to measures that met at least two of the following criteria: RMSEA < .06, CFI > .9, and SRMR < .08. \*The model failed to converge.

### ***Data Transformations***

We followed the same procedure as in Study 1 for all multi-item measures.

### ***Exploring the Impact of Shared Experience***

Overall descriptives (means, SDs, measure reliability, and inter-measure correlations) are presented in Table 9. Descriptive statistics for all measures as a function of the Video  $\times$  Experience design are presented in Table 10. ANOVA summary statistics are presented in Table 11.

As shown in Table 10, participants in the awe video conditions (individual, collective) reported higher positive emotion than participants in the baseline video conditions ( $M_s = 5.43$  and  $3.54$ , respectively), confirming the video manipulation's effectiveness.

**Table 9**  
**Scale Descriptives and Inter-Scale Correlations, Study 2**

	<i>M</i>	<i>SD</i>	$\alpha$	1	2	3	4	5	6	7	8	9	10
1. Awe intensity	3.28	1.70	—	—									
2. Positive awe-related emotion	3.52	1.61	.86	.82***	—								
3. Negative awe-related emotion	0.70	1.03	.63	.03	.05	—							
4. Humility – self	1.21	1.13	—	.01	.06	.09	—						
5. Humility – other people	3.53	1.42	—	.06	.07	.13*	.04	—					
6. Humility – external factors	3.26	1.74	—	.19**	.20**	.08	.02	.17*	—				
7. Small-self perceptions	2.70	1.26	.80	.06	.02	.21**	.32***	.02	.11	—			
8. Satisfaction with life	3.19	1.34	.85	.21**	.20**	.03	.27***	.20**	.17**	.35***	—		
9. Presence of meaning in life	3.21	1.59	.91	.24***	.31***	.12	.26***	.05	.19**	.58***	.56***	—	
10. Search for meaning in life	3.90	1.53	.90	.08	.08	.07	.02	.04	.11	.21**	.17*	.24***	—
11. Subjective happiness	3.27	1.32	.83	.17**	.18**	.14*	.35***	.01	.18**	.54***	.57***	.63***	.18**

*Note.* For all scales and subscales, possible range = 0 to 6. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$  (uncorrected for multiple comparisons).

**Table 10**  
***Descriptive and Inferential Statistics as a Function of Baseline/Awe Video and Individual/Shared Experience, Study 2***

	Baseline						Awe					
	Individual			Shared			Individual			Shared		
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>
Awe intensity	2.43	1.42	77	2.15	1.49	40	4.08	1.39	77	4.41	1.39	44
Positive awe-related emotion	2.80 <sub>a</sub>	1.46	75	2.27 <sub>a</sub>	1.18	40	4.20 <sub>b</sub>	1.38	77	4.67 <sub>b</sub>	1.17	44
Negative awe-related emotion	0.57	0.98	77	0.91	1.28	40	0.69	0.97	76	0.74	0.95	44
Small-self perceptions	2.62	1.29	76	2.63	1.10	40	2.88	1.35	76	2.60	1.17	44
Humility – self	1.30	1.12	77	1.27	1.26	40	1.14	1.05	77	1.09	1.18	44
Humility – other people	3.48	1.32	77	3.42	1.55	40	3.49	1.45	77	3.80	1.41	44
Humility – external factors	3.10	1.75	77	2.92	1.49	40	3.29	1.59	77	3.77	2.11	44
Satisfaction with life	3.10 <sub>a</sub>	1.36	77	2.98 <sub>a</sub>	1.21	40	3.08 <sub>a</sub>	1.33	77	3.72 <sub>a</sub>	1.34	44
Presence of meaning in life	3.11 <sub>a</sub>	1.63	77	2.73 <sub>a</sub>	1.35	40	3.13 <sub>a</sub>	1.60	77	3.98 <sub>b</sub>	1.49	44
Search for meaning in life	1.99	1.56	77	3.86	1.36	40	4.03	1.40	77	3.57	1.80	44
Subjective happiness	3.16	1.41	77	3.27	1.16	40	3.10	1.31	77	3.77	1.25	44

*Note.* Possible range = 0 to 6. Where applicable (i.e., where significant Video × Experience interaction effects emerged), subscripts reflect results of Bonferroni-corrected post hoc comparisons; for these variables, within rows, means with different subscripts differ at  $p < .05$ .



**Table 11**  
ANOVA Summary Statistics, Study 2

	Effect	df <sub>num</sub>	df <sub>den</sub>	F	p	$\eta^2$	BF <sub>01</sub>
Awe intensity	Video	1	234	103.17	< .001	.30	0.00
	Experience	1	234	0.02	.89	< .001	6.39
	Video $\times$ Experience	1	234	2.51	.11	.007	0.00
Positive awe-related emotion	Video	1	232	193.61	< .001	.31	0.00
	Experience	1	232	0.05	.87	< .001	6.73
	Video $\times$ Experience	1	232	7.48	.007	.02	0.00
Negative awe-related emotion	Video	1	233	0.03	.87	< .001	6.93
	Experience	1	233	1.91	.17	.008	2.84
	Video $\times$ Experience	1	233	1.06	.31	.004	19.84
Small-self perceptions	Video	1	232	0.47	.50	.002	4.58
	Experience	1	232	0.70	.41	.003	4.85
	Video $\times$ Experience	1	232	0.73	.40	.003	22.61
Humility – self	Video	1	234	1.22	.27	.005	3.83
	Experience	1	234	0.06	.81	< .001	6.52
	Video $\times$ Experience	1	234	0.01	.93	< .001	25.72
Humility – other people	Video	1	234	0.99	.32	.004	5.32
	Experience	1	234	0.41	.52	.002	5.41
	Video $\times$ Experience	1	234	0.86	.36	.004	28.55
Humility – external factors	Video	1	234	4.79	.03	.02	1.37
	Experience	1	234	0.43	.51	.002	5.24
	Video $\times$ Experience	1	234	2.00	.16	.008	7.39
Satisfaction with life	Video	1	234	4.12	.04	.02	2.49
	Experience	1	234	2.08	.15	.009	2.26
	Video $\times$ Experience	1	234	4.55	.03	.02	5.98
Presence of meaning in life	Video	1	234	9.01	.003	.04	0.67
	Experience	1	234	1.27	.26	.005	3.30
	Video $\times$ Experience	1	234	8.43	.004	.03	2.43
Search for meaning in life	Video	1	234	0.36	.55	.002	6.50
	Experience	1	234	2.03	.17	.009	2.48
	Video $\times$ Experience	1	234	0.62	.43	.003	16.44
Subjective happiness	Video	1	234	1.51	.22	.006	5.05
	Experience	1	234	4.82	.03	.02	0.62
	Video $\times$ Experience	1	234	2.49	.12	.01	3.32

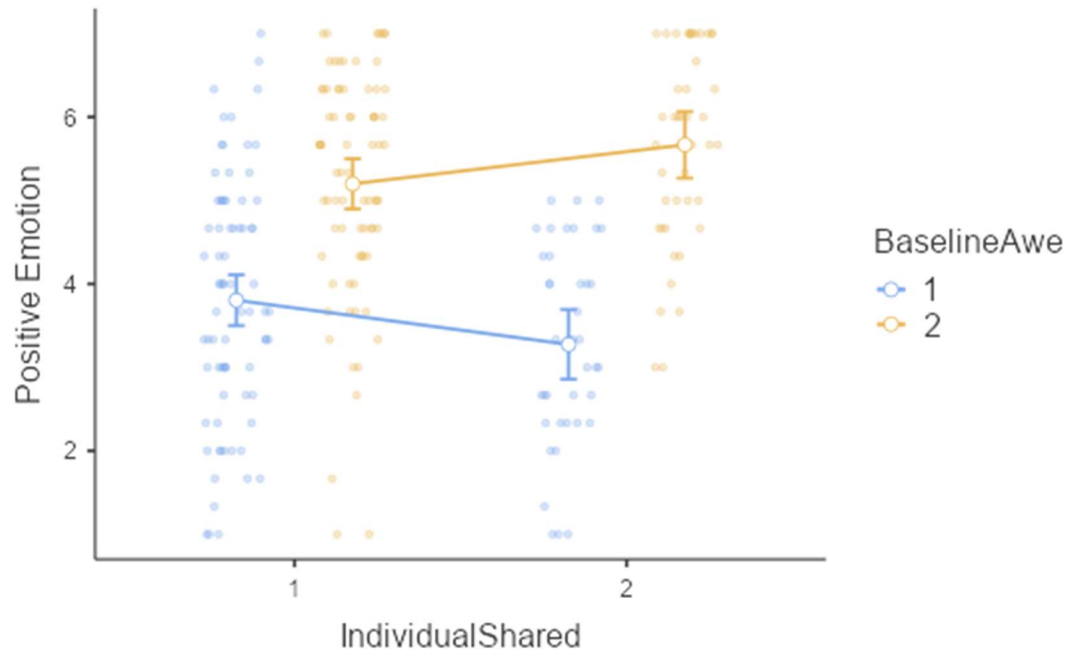
*Note.* Following Jeffreys (1961), we interpret BF<sub>01</sub> as follows: BF<sub>01</sub> < 3 = unclear evidence; 3 < BF<sub>01</sub> < 10 = moderate evidence for the null hypothesis; BF<sub>01</sub> > 10 = strong evidence for the null hypothesis.

This effect was qualified by a Video  $\times$  Experience interaction (see Figure 1).

Positive emotion ratings were higher in the awe versus baseline video conditions.

Descriptively, shared experience led to higher positive emotion ratings in both the baseline and awe video conditions and the effect appeared larger in the awe video

condition than in the baseline video condition, but these contrasts did not yield reliable effects.



*Figure 1.* Mean positive emotion ratings as a function of video and experience. BaselineAwe 1 = baseline video, 2 = awe video. IndividualShared 1 = individual experience, 2 = shared experience.

### ***Testing the Relationships between Awe, Self-Diminishment, and Wellbeing***

Each of the self-diminishment and wellbeing measures were analyzed as a function of video condition and individual versus shared experience

**Awe, Experience, and Self-Diminishment.** No reliable effects emerged for self humility, other humility, or small-self perceptions.

**External Humility.** There was a main effect of video on the extent to which participants attributed their achievements to external forces (hereafter, external humility) ( $p = .03$ ). Participants who watched the awe video reported higher external humility

scores than participants who watched the baseline video ( $M_s = 4.53$  and  $4.01$ , respectively).

**Awe, Experience, and Wellbeing.** No reliable effects emerged for search for meaning in life.

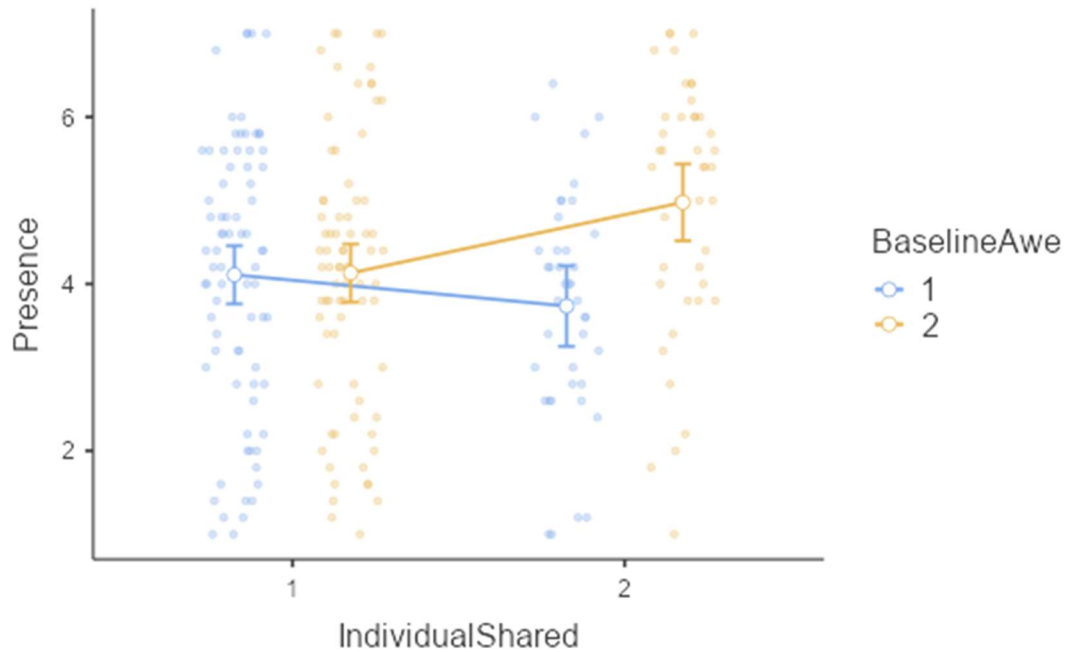
***Presence of Meaning in Life.*** There was a main effect of video on the extent to which participants believed that there was a presence of meaning in their life ( $p = .003$ ). Participants who watched the awe video reported higher presence of meaning in life scores than participants who watched the baseline video ( $M_s = 4.55$  and  $3.92$ , respectively).

There was an interaction between the effect of video and experience on the extent to which participants reported presence of meaning in their life (see Figure 2). Participants in the awe video condition—but not the baseline video condition—reported higher presence of meaning in life scores in the shared experience condition than in the individual experience condition.

***Satisfaction with Life.*** There was a main effect of video on the extent to which participants reported being satisfied with their life. Participants who watched the awe video reported higher satisfaction with life than participants who watched the baseline video ( $M_s = 4.40$  and  $4.04$ , respectively).

There was an interaction between the effect of video and experience on the extent to which participants reported being satisfied with their life (see Figure 3). Descriptively, participants in the awe video condition—but not the baseline video condition—reported higher life satisfaction in the shared experience condition than in the individual

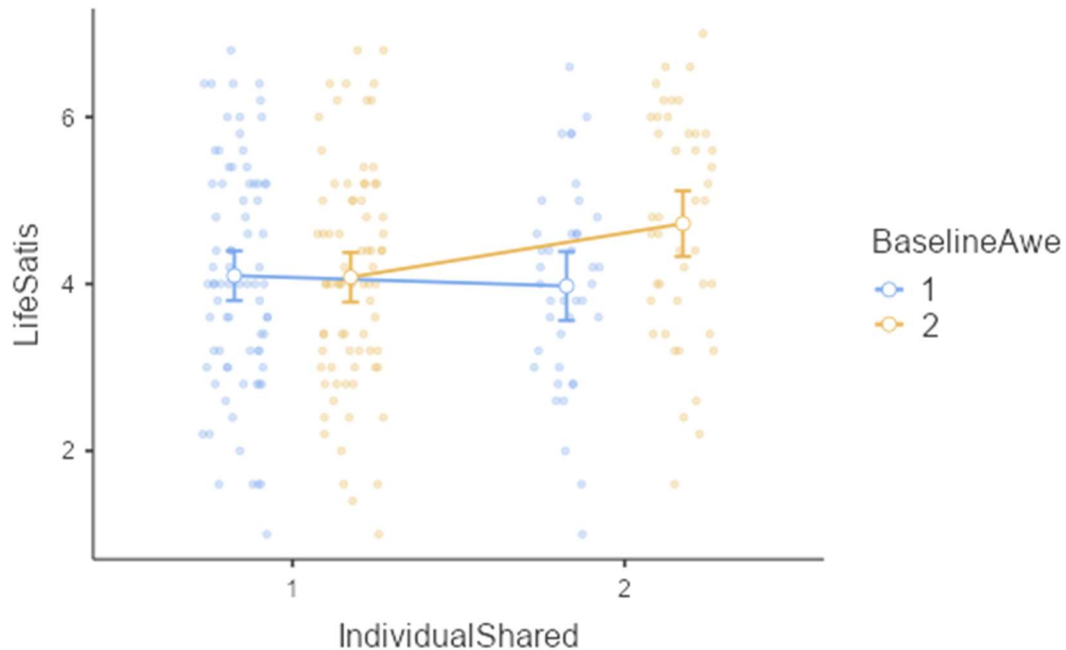
experience condition; however, Bonferroni-corrected post hoc tests yielded no reliable differences.



*Figure 2.* Mean presence of meaning in life scores as a function of video and experience. BaselineAwe 1 = baseline video, 2 = awe video. IndividualShared 1 = individual experience, 2 = shared experience.

**Subjective Happiness.** There was a main effect of experience on the extent to which participants reported being happy. Participants who watched either video with a housemate reported being happier than participants who watched either video alone ( $M_s = 4.52$  and  $4.13$ , respectively).

**Self-Diminishment as a Mediator between Awe and Wellbeing.** To facilitate analysis and comparison of results across both studies presented in this thesis, we ignored the individual/shared experience factor and coded both baseline conditions as 0 and both awe conditions as 1.



*Figure 3.* Mean satisfaction with life scores as a function of video and experience. BaselineAwe 1 = baseline video, 2 = awe video. IndividualShared 1 = individual experience, 2 = shared experience.

Because we found effects of video condition on external humility, presence of meaning in life, and satisfaction with life, we conducted two mediation tests with video condition as the predictor and external humility as the mediator, separately for presence of meaning in life and satisfaction with life. As shown in Table 12, there was no evidence of statistically reliable indirect effects.

To parallel the analyses in Study 1, we also conducted a number of unplanned mediation analyses. Inspection of the correlations indicated that both awe intensity and positive awe emotion scores correlated with external humility scores, as well as scores for presence of meaning in life, satisfaction with life, and subjective happiness; external humility scores also correlated with these wellbeing measures. As a result, we conducted six mediation analyses, three with awe intensity as the predictor and three with positive

Table 12

*Mediation of Video Condition—Wellbeing Relationship by External Humility, Study 2*

Criterion Measure	Estimate	Effect	Estimate	SE	Z	p
Satisfaction with Life	Mediation	Indirect	0.05	0.04	1.51	.13
		Direct	0.20	0.17	1.19	.23
		Total	0.26	0.17	1.49	.14
	Path	Video condition → External humility	0.42	0.22	1.87	.06
		External humility → Life satisfaction	0.13	0.05	2.56	.01
		Video condition → Life satisfaction	0.21	0.17	1.19	.23
Presence of Meaning	Mediation	Indirect	0.07	0.04	1.55	.12
		Direct	0.39	0.20	1.93	.05
		Total	0.46	0.20	2.25	.03
	Path	Video condition → External humility	0.42	0.22	1.87	.06
		External humility → Presence	0.16	0.06	2.77	.006
		Video condition → Presence	0.39	0.20	1.93	.05

awe emotions as the predictor. As shown in Table 13, there was no evidence of statistically reliable indirect effects.

## **Discussion**

For Study 2, participants watched either an awe-inducing nature video or a baseline nature video, either alone or with a housemate. After watching the video, they rated the intensity of the awe experience and awe-related emotions in addition to completing self-report measures that assessed self-diminishment (humility, small-self perceptions) and wellbeing (satisfaction with life, meaning in life, subjective happiness).

### ***Effects of Shared Experience***

The effect of shared experience on awe was examined with two self-report measures: awe intensity and positive awe-related emotions. We did not observe differences in awe intensity or awe-related emotions for individual versus shared experiences and in both cases, the Bayes factors (see Table 11) suggested moderate evidence for the null hypothesis. Indirect evidence for an impact of shared experience emerged in participants' presence of meaning of life scores, where participants in the awe (but not baseline) video condition reported higher presence of meaning in life scores in the shared experience condition than in the individual experience condition. Overall, however, this study provided moderate evidence that shared awe experiences do not differ from individual awe experiences.

**Table 13**  
***Mediation of Awe Intensity / Positive Awe-Related Emotion–Wellbeing Relationship by External Humility, Study 2***

Criterion Measure	Predictor	Estimate	Effect	Estimate	SE	Z	p
Satisfaction with life	Awe intensity	Mediation	Indirect	0.02	0.01	1.75	.08
			Direct	0.15	0.05	2.88	.004
			Total	0.17	0.05	3.32	< .001
		Path	Awe intensity → External humility	0.20	0.07	2.98	.003
			External humility → Life satisfaction	0.11	0.05	2.17	.03
			Awe intensity → Life satisfaction	0.15	0.05	2.88	.004
	Positive awe-related emotion	Mediation	Indirect	0.02	0.01	1.70	.09
			Direct	0.14	0.05	2.63	.009
			Total	0.16	0.05	3.07	.002
		Path	Positive awe-related emotion → External humility	0.21	0.07	3.11	.002
			External humility → Life satisfaction	0.10	0.05	2.02	.04
			Positive awe-related emotion → Life satisfaction	0.14	0.05	2.63	.009
Presence of meaning	Awe intensity	Mediation	Indirect	0.03	0.01	1.87	.06
			Direct	0.19	0.06	3.26	.001
			Total	0.22	0.06	3.73	< .001
		Path	Awe intensity → External humility	0.20	0.07	2.98	.003
			External humility → Presence	0.14	0.06	2.40	.02
			Awe intensity → Presence	0.19	0.06	3.26	.001
	Positive awe-related emotion	Mediation	Indirect	0.02	0.01	1.69	.09
			Direct	0.28	0.06	4.49	< .001
			Total	0.30	0.06	4.94	< .001
		Path	Positive awe-related emotion → External humility	0.22	0.07	3.11	.002
			External humility → Presence	0.12	0.06	2.01	.04
			Positive awe-related emotion → Presence	0.28	0.06	4.49	< .001
Subjective happiness	Awe intensity	Mediation	Indirect	0.02	0.01	1.84	.07
			Direct	0.11	0.05	2.27	.02
			Total	0.14	0.05	2.73	.006
		Path	Awe intensity → External humility	0.20	0.07	2.98	.003
			External humility → Happiness	0.11	0.05	2.34	.02
			Awe intensity → Happiness	0.11	0.05	2.27	.02
	Positive awe-related emotion	Mediation	Indirect	0.02	0.01	1.76	.08
			Direct	0.13	0.05	2.73	.02
			Total	0.15	0.05	2.82	.005
		Path	Positive awe-related emotion → External humility	0.22	0.07	3.11	.002
			External humility → Happiness	0.11	0.05	2.14	.03
			Positive awe-related emotion → Happiness	0.13	0.05	2.37	.02

These results are not definitive, however, and more investigation is needed because of potential methodological limitations. Due to unforeseen circumstances in relation to the pandemic, we were unable to observe participants as they watched the videos. As a result, we do not know how focused they were when watching the videos, nor do we know anything about the behavior of the housemates present in the shared



experience condition during the video viewing. Future research should account for this and exert more control.

### ***Awe and Self-Diminishment***

The impact of awe on self-diminishment was examined using several self-report measures: a five-item small-self perceptions measure, and three items assessing humility. We found that participants in the individual and shared awe conditions scored higher on external-factors humility than participants in the baseline conditions. However, there were no effects of awe/baseline video condition on small-self perceptions, self humility, or other-people humility, and in all cases the Bayes factors suggested moderate evidence for the null hypothesis. These results provide tentative support for the hypothesized awe and self-diminishment relationship, but only for one of four measures.

These analyses also failed to yield any reliable effects for individual/shared experience condition and did yield Bayes factors suggesting moderate evidence for the null hypothesis. In relation to our research question, this evidence suggests that shared awe experiences may be equal to individual awe experiences in relation to self-diminishment.

### ***Awe and Wellbeing***

We examined the relationships between awe and wellbeing using four measures: satisfaction with life, presence of meaning in life, search for meaning in life, and subjective happiness. Results indicated that participants in the individual and shared awe conditions, compared to participants in the baseline conditions, scored higher on presence of meaning in life and satisfaction with life, but not search for meaning in life and subjective happiness (where the Bayes factors suggested moderate evidence for a null

relationship). Moreover, both awe intensity and positive awe-related emotion correlated positively with presence of meaning in life, satisfaction with life, and subjective happiness. These results confirm the hypothesized awe–wellbeing relationship.

With regard to the impact of shared experience, only subjective happiness showed a main effect, such that subjective happiness was higher in the shared than individual experience condition. The results also yielded Video  $\times$  Experience interactions for presence of meaning in life and satisfaction with life. Descriptively, both measures showed higher scores in the shared versus individual experience *awe* (but not baseline) conditions (although the contrast was reliable only for presence of meaning in life). Nonetheless, the Bayes factors for the nonsignificant main and interaction effects generally provided unclear evidence with regard to the null hypothesis. Collectively, these results provide some evidence for the impact of shared experience on wellbeing.

### ***Self-Diminishment as Mediator***

Although results indicated that awe was associated with external humility, presence of meaning in life, and satisfaction with life, we found that external humility did not mediate the relationship between awe and the two wellbeing measures, respectively. These findings provide no evidence that self-diminishment is a mediator between awe and wellbeing.

## **General Discussion**

The present research had two goals. The primary goal was to explore how shared experience may influence awe. The secondary goal was to contribute to the understanding of the awe–wellbeing relationship by exploring self-diminishment as a potential mediator.

## Effects of Shared Experience

We conducted two studies to explore the impact of shared experience on awe. Three plausible outcomes were identified: (1) Collective experiences, relative to individual experiences, could induce more awe if the shared experience prompts more attention to the awe-inducing stimulus. (2) Collective and individual awe experiences could be equivalent, if the asocial nature of awe counteracts the effects of shared experience. (3) Collective experiences, relative to individual experiences, could induce less awe, if the presence of others distracts from the awe-inducing stimulus.

Awe-related emotions did not differ as a function of individual versus shared awe condition. Study 1 results indicated that shared awe experiences were rated as more intense than individual awe experiences, whereas Study 2 results indicated that awe intensity did not differ as a function of individual versus shared awe condition. In spite of this, the Study 2 results revealed indirect evidence that an impact of shared experience in participants' presence of meaning of life scores, where participants in the awe (but not baseline) video condition reported higher presence of meaning in life scores in the shared experience condition than in the individual experience condition.

This research question does not have a clear answer. Both Study 1 and Study 2 results presented some evidence that shared experience heightens awe intensity and positive awe-related emotion. Yet, the effect of shared awe versus individual awe and baseline conditions on positive awe-related emotion was not reliable in Study 2. Moreover, Bayes factors for awe-related emotions (Study 1 and Study 2) and awe intensity (Study 2) suggested moderate evidence for the null hypothesis, that shared and individual experiences did not differ.

Potential methodological limitations across both studies might contribute to these unclear findings. For Study 1, we did not control for the number of people that may have been included in the shared experience narratives. The shared experience literature presented findings based on studies where there were two participants sharing an experience (Boothby et al., 2014; Wagner et al., 2014). Future research should control for the number of individuals within the shared awe experience condition.

Due to unforeseen circumstances in relation to the pandemic, we were unable to conduct Study 2 in a more controlled experimental setting. As a result, we were unable to observe participants as they watched the videos and do not know how focused they were, nor do we know anything about the behavior of the housemates present in the shared experience condition during the video viewing. Anecdotally, some participants had emailed researchers that they were unable to move on from the video before the designated set time, suggesting a lack of engagement with the videos. Future research should exert more control to ensure participant compliance.

### **Awe and Self-Diminishment**

Previous research suggests that individuals report greater self-diminishment when experiencing awe (Shiota et al., 2007; Piff et al., 2015; Campos et al., 2013; Stellar, Gordon, Anderson et al., 2017). As a result, we hypothesized that there would be a positive association between awe and self-diminishment and that awe experiences would lead to greater self-diminishment than baseline experiences. Results indicated that there may be a relationship between awe and self-diminishment, but did not provide a clear answer as to what that relationship may look like. In support of the hypothesis, awe intensity predicted external humility in Study 2. In contrast, although awe intensity

predicted small-self perceptions in Study 1, it was in the opposite direction than expected in that participants with higher awe intensity scores scored *lower* on small-self perceptions than participants with lower awe intensity scores. Moreover, there was some evidence that shared and individual awe experiences did not differ in relation to self-diminishment.

Future research is needed to understand the conflicting findings with the awe–self-diminishment associations. Although small-self perceptions and humility may be forms of self-diminishment (Shiota et al., 2007; Piff et al., 2015; Campos et al., 2013; Stellar, Gordon, Anderson et al., 2017), they may not interact with awe in the same way. Study 1 participants were removed from their awe experience, so they may have been reflecting on the experience with a different perspective and more focused on how it impacted the self, therefore more aware of self than they might have been within the actual awe experience. Study 2 participants, although being present in the awe experience right then and there, may not have been able to be fully present in the experience due to distractions that would have been controlled for if we were able to run the study in a more controlled environment. If they weren't able to be fully present, then they may not have felt a sense of self-diminishment. Future research should explore how time may influence self-diminishment as it relates to awe.

### **Awe and Wellbeing**

Previous research suggests that individuals report greater wellbeing when experiencing awe (Van Cappellen et al., 2016; Rudd et al., 2012; Stellar, Gordon, Piff et al., 2017; Van Cappellen & Saroglou, 2012; Steger et al., 2006). As a result, we hypothesized that there would be a positive association between awe and wellbeing and

that awe experiences would lead to greater wellbeing than baseline experiences. Results indicated that there may be a positive relationship between awe and wellbeing, but it is not clear as to how and when awe is associated with wellbeing.

Positive awe-related emotions predicted search for meaning in life in Study 1 whereas both awe intensity and positive awe-related emotions correlated positively with satisfaction with life, presence of meaning in life, and subjective happiness in Study 2. In addition, there was some evidence that wellbeing was greater for awe experiences versus baseline experiences, specifically for satisfaction with life and presence of meaning in life. Moreover, there was some evidence that presence of meaning in life was greater for shared awe experiences versus individual awe experiences. However, there was also some evidence that shared and individual awe experiences did not differ in relation to wellbeing.

Future research is needed to understand how and when awe is associated with wellbeing. Study 1 participants may have remembered the positive impact that their awe experience had on them, and may in turn have felt a need to search for meaning in life to recreate the positive feelings associated with their awe experience. Since Study 2 participants were present in their awe experience, they may have felt a presence of meaning in life in that moment due to the universality and connectedness that awe promotes (Van Cappellen & Saroglou, 2012; Steger et al., 2006). This universality and connectedness could have also allowed them to shift their focus from the self to others, which may have led them to feel satisfied with their life as well (Stellar, Gordon, Piff et al., 2017; Rudd et al., 2012). Once again, future research should explore how time may

influence wellbeing as it relates to awe. In addition, it is important to note that negative effects from the pandemic may have affected participant performance for both studies.

### **Self-Diminishment as Mediator**

Research suggests that self-diminishment may play a role in the relationship between awe and wellbeing (Stellar, Gordon, Piff et al., 2017; Rudd et al., 2012; Shiota et al., 2007). In light of this, we explored self-diminishment as a potential mediator for the awe-wellbeing relationship. Results indicated that humility did not mediate the relationship between awe and wellbeing. Yet, there was some evidence that small-self perceptions mediates this relationship.

Future research should explore the role of self-diminishment as a mediator and why small-self perceptions may be a mediator while humility may not. As previously stated, self-diminishment has been suggested as a mediator for the awe-humility relationship (Stellar, Gordon, Anderson et al., 2017). Although external humility was associated with awe and wellbeing measures respectively, it may not be a mediator for the awe-wellbeing relationship due to lack of evidence of associations between small-self perceptions and external humility.

### **Conclusion**

In the current research, we set out to explore the impact of shared experience on awe. To explore the effects of “collective awe,” we conducted two studies where we either asked participants to write about a time when they experienced awe as either an individual or shared experience (Study 1) or had them watch an awe-inducing or neutral video, either alone or with another person (Study 2). Regardless of the study they participated in, participants completed measures of awe and awe-related emotions, self-

diminishment, and wellbeing. The evidence provided no clear answer as to how shared experience may impact awe and how it relates to self-diminishment and wellbeing. There was some evidence for an awe–self-diminishment association, but conflicting evidence suggests that more research needs to be done to determine what may affect this relationship. Moreover, the results indicated that there may be an awe–wellbeing relationship, but there is a need for a clearer theory on how and when awe is associated with wellbeing.



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## **Appendix A: Study Instructions**

### **Study 1**

In this study, we'd like to learn about experiences you've had or events you've witnessed that have evoked a feeling of awe -- the feeling that you get in the presence of something so overwhelming that it's hard to fully understand or appreciate.

In the following part of the study, we are going to ask you to think about a time you felt awe. We'll give you a cue about the specific kind of experience we want you to think about. When we do, take a moment to mentally "re-live" the experience/event, and then describe it in as much detail as possible.

Which of the following kinds of awe experiences can you think of? (Select multiple options if applicable.)

- I can think of a time when I felt awe when I was by myself.
- I can think of a time when I felt awe when at least one other person was present.
- I can't think of a time when I felt awe at all.

#### ***Individual Awe Prompt***

Take a minute to think back on a time when you felt awe and you were by yourself. Write about it in as much detail as you can remember, to really re-live the experience. We will be coding your narrative for how well it describes the experience/event and evokes the emotion.

#### ***Collective Awe Prompt***

Take a minute to think back on a time when you felt awe and at least one other person was present. Write about it in as much detail as you can remember, to really re-live the experience. We will be coding your narrative for how well it describes the experience/event and evokes the emotion.

### **Study 2**

In this study, we are interested in momentary wellbeing in people living together.

To study the impact of shared living, we are asking some participants to complete the first part of the study with a housemate present, and others to complete the entire study alone.

At the present moment, is there someone else available to participate in the next portion of the study with you?

We would simply like them to watch a video with you that lasts 3-5 minutes.

- Yes. There is someone available to watch the video with me.
- No. There is no one available to watch the video with me.

***Individual Experience***

You will now watch a video that will last 3-5 minutes.

The purpose of the video is to create a baseline condition that cancels out the random variation between different participants and different types of households, having everyone begin the survey from the same psychological starting point.

Before advancing to the next page to watch the video, PLEASE MAKE SURE YOU ARE ABLE TO WATCH THE VIDEO ENTIRELY ALONE.

Please watch the entire video in FULL SCREEN MODE with your SOUND ON.

***Shared Experience***

You will now watch a video that will last 3-5 minutes.

The purpose of the video is to create a baseline condition that cancels out the random variation between different participants and different types of households, having everyone begin the survey from the same psychological starting point.

Before advancing to the next screen to watch the video, PLEASE MAKE SURE YOUR HOUSEMATE IS WATCHING WITH YOU.

Please watch the entire video in FULL SCREEN MODE with your SOUND ON.

***Post Video Reminder, Shared Experience Only***

Your housemate should now leave the room so you can complete the rest of the study ALONE.

## Appendix B: Measures

### Post-Writing Questions, Collective Awe Only, Study 1 Only

1. How many people were there?
2. Who was there and what was your relationship with them?
3. Were you aware of the presence of others in the moment?

### Awe Ratings

1. How intensely did you feel awe?
2. How positive was the experience?
3. How negative was the experience?

*Note.* Items 2–3 were presented in random order, and in Study 1 only. Response scale: 0 (*not at all*) to 6 (*extremely*).

### Awe-Related Emotions

To what extent did you feel each of these other, related emotions?

1. Amazement
2. Inspiration
3. Wonder
4. Anxiety
5. Dread
6. Fear

*Note.* Item order randomized. Response scale: 0 (*not at all*) to 6 (*extremely*).

### Awe Elicitor Category, Study 1 Only

Think back to the experience that you wrote about, which of the following elicited the feeling of awe? (Check all that apply.)

- ☐ Nature
- ☐ Technology
- ☐ A work of art or a creative act
- ☐ An individual's talent, skill, or accomplishment
- ☐ Other (Specify:)

### Self-Diminishment Measures

*Note.* Measure order and item order within measure randomized.

***Humility (adapted from Stellar et al., 2017)***

Consider for a moment all of your achievements and accomplishments.

1. To what extent have you contributed to your achievements/accomplishments?
2. To what extent have other people contributed to your achievements and accomplishments?
3. To what extent have external forces (God or luck) contributed to your achievements/accomplishments?

*Note.* Response scale: 0 (*not at all*) to 4 (*completely*). Original response scale: 0% to 100% slider scale.

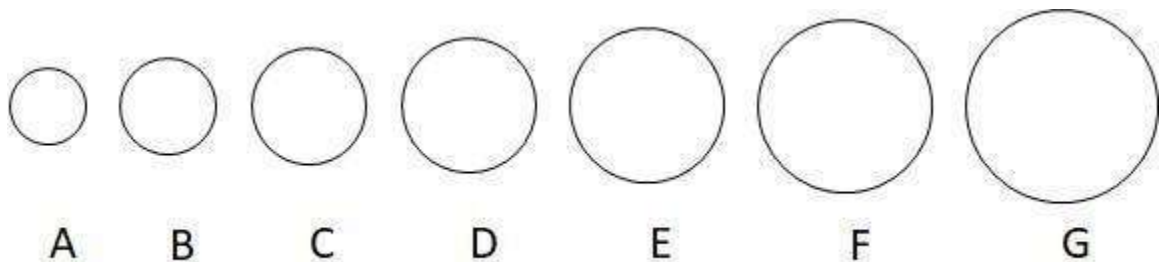
***Small Self (Bai et al., 2017)***

Rate the extent to which you agree with each of the following statements.

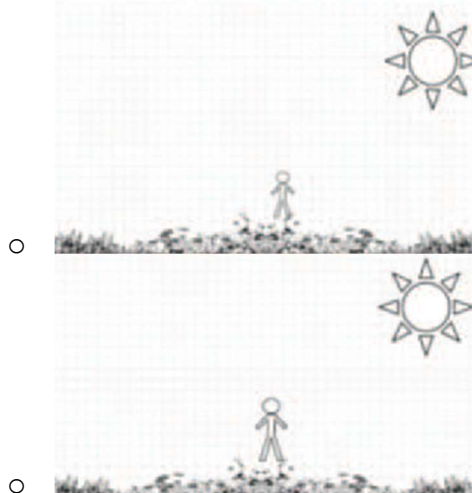
1. In general, I feel relatively small.
2. In general, I feel insignificant.

*Note.* Response scale: 0 (*not at all*) to 4 (*extremely*). Original response scale: 1 (*strongly disagree*) to 7 (*strongly agree*).

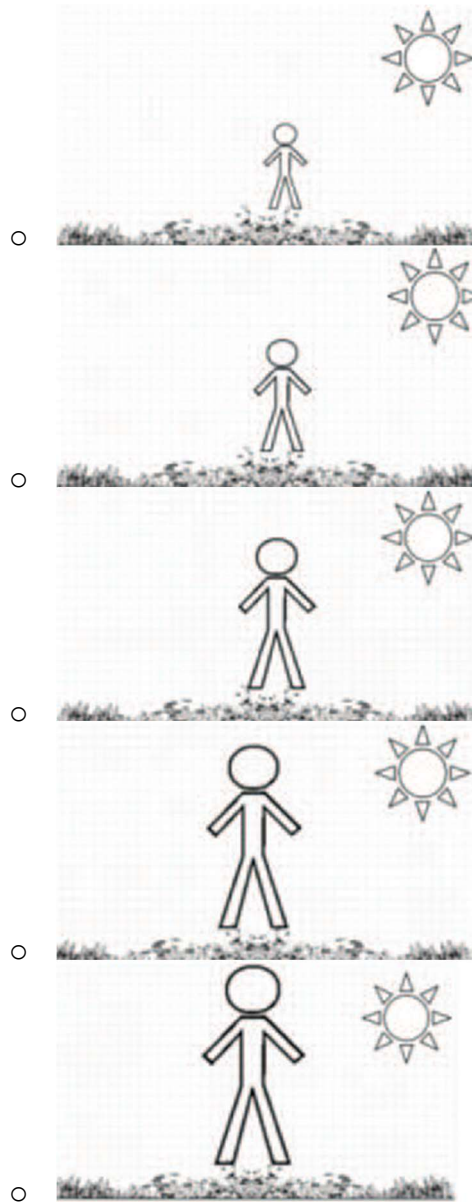
Which of the following circles best represents how big or small you feel about yourself?



Which of the following drawings best represents you?

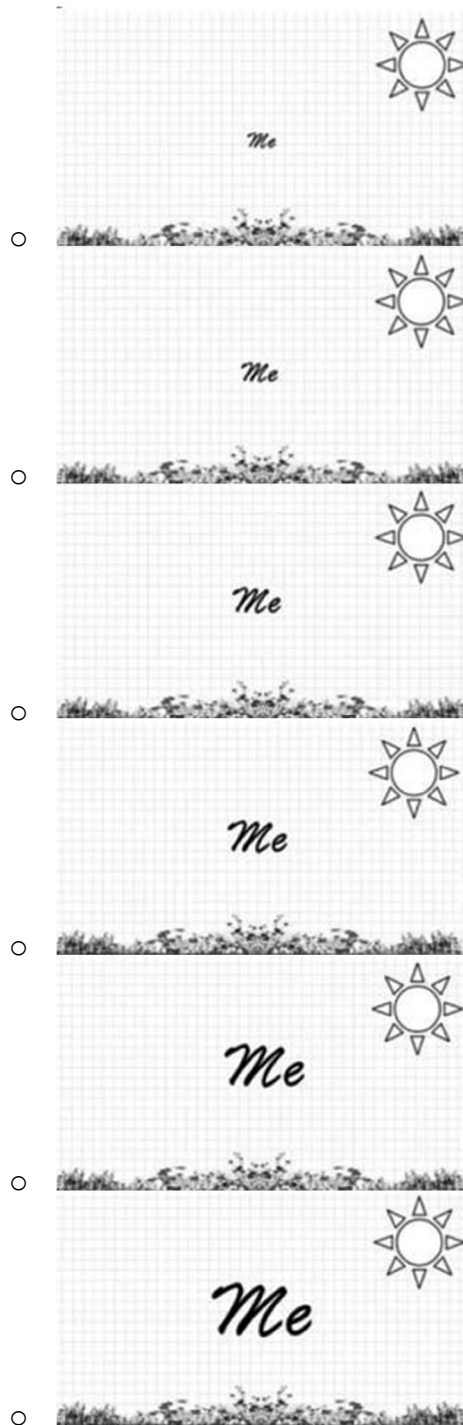






Looking at the drawing you selected in the question above, which of the following signatures would most closely resemble your own?





### Wellbeing Measures

*Note.* Measure order and item order within measure randomized.

#### ***Satisfaction with Life (Diener, Emmons, Larsen, & Griffin, 1985)***

Rate the extent to which you agree with each of the following statements.

1. In most ways my life is close to my ideal.
2. The conditions of my life are excellent.
3. I am satisfied with my life.
4. So far I have gotten the important things I want in life.
5. If I could live my life over, I would change almost nothing.

*Note.* Response scale: -3 (*disagree strongly*) to 0 (*neither disagree nor agree*) to +3 (*agree strongly*). Original response scale: 1 (*strongly disagree*) to 7 (*strongly agree*).

***Meaning in Life (Steger, Frazier, Oishi, & Kaler, 2006)***

Rate the extent to which each of the following statements is true.

1. I understand my life's meaning. (P)
2. I am looking for something that makes my life feel meaningful. (S)
3. I am always looking to find my life's purpose. (S)
4. My life has a clear sense of purpose. (P)
5. I have a good sense of what makes my life meaningful. (P)
6. I have discovered a satisfying life purpose. (P)
7. I am always searching for something that makes my life feel significant. (S)
8. I am seeking a purpose or mission for my life. (S)
9. My life has no clear purpose. (P – reverse-scored)
10. I am searching for meaning in my life. (S)

*Note.* P = presence of meaning subscale, S = search for meaning subscale. Response scale: 0 (*absolutely untrue*) to 6 (*absolutely true*). Original response scale: 1 (*absolutely untrue*) to 7 (*absolutely true*).

***Gratitude (McCullough, Emmons, & Tsang, 2002)***

Rate the extent to which you agree with each of the following statements.

1. I have so much in life to be thankful for.
2. If I had to list everything in life that I felt grateful for, it would be a long list.
3. When I look at the world, I don't see much to be grateful for. (reverse-scored)
4. I am grateful to a wide variety of people.
5. As I get older, I find myself more able to appreciate the people, events, and situations that have been part of my life history.
6. Long amounts of time can go by before I feel grateful to something or someone. (reverse-scored)

*Note.* Response scale: -3 (*disagree strongly*) to 0 (*neither disagree nor agree*) to +3 (*agree strongly*). Original response scale: 1 (*strongly disagree*) to 7 (*agree strongly*).

***Subjective Happiness (Lyubomirsky & Lepper, 1999)***

1. In general I consider myself:
2. Compared to most of my peers, I consider myself:
3. Some people are generally very happy. They enjoy life regardless of what is going on, getting the most out of everything. To what extent does this characterization describe you?
4. Some people are generally not very happy. Although they are not depressed, they never seem as happy as they might be. To what extent does this characterization describe you?

*Note.* Response scale: Q1, -3 (*not a very happy person*) to +3 (*a very happy person*). Q2, -3 (*less happy*) to 0 (*equally happy*) to +3 (*more happy*). Q3-Q4, 0 (not at all) to 3 (somewhat) to 6 (very much). Original response scale: Q1, 1 (*not a very happy person*) to 7 (*a very happy person*). Q2, 1 (*less happy*) to 7 (*more happy*). Q3-Q4, 1 (*not at all*) to 7 (*a great deal*).

Appendix C: Study 1 Supplementary Analyses

Table S1  
Exploratory Factor Analyses, Random Sample, Study 1

Measure	Factor	Items	Factor Loading	Eigenvalue	% Variance	Cumulative %	$\chi^2$ (p)	TLI	RMSEA
Awe-related emotion	Negative emotion	Anxiety	.82	2.03	33.8	33.8	3.95 (.41)	1.00	0.00
		Dread	.71						
		Fear	.89						
Positive emotion	Amazement	Amazement	.72	1.31	21.9	55.6	3.95 (.41)	1.00	0.00
		Inspiration	.63						
		Wonder	.61						

Note. We followed Hu and Bentler's (1999) conventions for good model fit, and accepted models that met at least two of the following criteria: non-significant  $\chi^2$ , TLI > .95, and RMSEA < .06. \* The *Self* item failed to load onto a factor.

**Table S2*****Confirmatory Factor Analyses, Randomized Sample, Study 1***

Measure	RMSEA	CFI	SRMR
Humility	0.00	1.00	0.00
Small-Self Perceptions	0.16	0.95	0.04
Satisfaction with Life	0.04	1.00	0.02
Meaning in Life	0.09	0.96	0.06
Subjective Happiness	0.00	1.00	0.01
Daily Gratitude	0.06	0.98	0.04

*Note.* Following Hu and Bentler (1999), we ascribed good model fit to measures that met at least two of the following criteria: RMSEA < .06, CFI > .9, and SRMR < .08.

Table S3

*Scale Descriptives and Inter-Scale Correlations. Randomized Sample, Study 1*

	<i>M</i>	<i>SD</i>	<i>α</i>	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Awe intensity	4.93	1.15	—	—												
2. Positive valence	5.15	1.59	—	.09	—											
3. Negative valence	0.68	1.53	—	.12	.79***	—										
4. Positive awe-related emotion	4.75	1.23	.68	.17	.69***	.49***	—									
5. Negative awe-related emotion	1.25	1.51	.85	.09	.56***	.53***	.34***	—								
6. Humility – self	0.99	1.05	—	.03	.02	.06	.04	.02	—							
7. Humility – other people	3.67	1.33	—	.05	.07	.06	.02	.14*	.003	—						
8. Humility – external factors	3.47	1.70	—	.02	.001	.004	.06	.07	.03	.37***	—					
9. Small-self perceptions	2.60	1.31	.87	.14*	.07	.12	.03	.02	.28***	.06	.12	—				
10. Satisfaction with life	3.35	1.31	.94	.04	.03	.008	.07	.01	.23***	.13	.16*	.52***	—			
11. Presence of meaning in life	3.48	1.41	.87	.08	.04	.11	.03	.08	.24***	.10	.18**	.58***	.55***	—		
12. Search for meaning in life	3.87	1.54	.91	.11	.19**	.23***	.23***	.02	.04	.10	.18**	.25***	.13	.21**	—	
13. Subjective happiness	3.50	1.37	.87	.05	.02	.06	.07	.06	.25***	.14*	.15*	.57***	.55***	.49***	.12	—
14. Daily gratitude	4.90	0.92	.81	.03	.03	.02	.05	.07	.21**	.32***	.25**	.35***	.57***	.40***	.05	.42***

*Note.* For all scales and subscales, possible range = 0 to 6. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$  (uncorrected for multiple comparisons).

**Table S4**  
***Descriptive and Inferential Statistics as a Function of Narrative Condition, Randomized Sample, Study 1***

	Individual			Shared			<i>t</i>	<i>p</i>	Cohen's <i>d</i>	BF <sub>01</sub>
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>				
Awe intensity	4.82	1.24	121	5.06	1.03	97	1.55	.12	0.21	2.17
Positive valence	5.10	1.58	119	5.22	1.62	97	0.53	.60	0.07	5.88
Negative valence	0.73	1.57	121	0.63	1.48	96	0.49	.63	0.07	6.00
Positive awe-related emotion	4.77	1.15	120	4.72	1.33	97	0.30	.77	0.04	6.44
Negative awe-related emotion	1.25	1.50	121	1.24	1.54	96	0.02	.98	0.003	6.71
Small-self perceptions	2.54	1.31	120	2.68	1.32	97	0.81	.42	0.11	4.95
Presence of meaning in life	3.52	1.49	120	3.43	1.31	96	0.46	.65	0.06	6.06
Search for meaning in life	3.99	1.62	121	3.72	1.42	96	1.26	.21	0.17	3.17
Satisfaction with life	3.34	1.35	120	3.36	1.26	96	0.07	.94	0.01	6.68
Subjective happiness	3.65	1.40	121	3.31	1.31	96	1.86	.06	0.25	1.33
Daily gratitude	4.84	1.02	76	4.95	0.8	74	0.74	.46	0.12	4.43
Humility – self	0.87	1.05	121	1.13	1.04	97	1.87	.06	0.26	1.30
Humility – other people	3.61	1.37	121	3.73	1.27	97	0.66	.51	0.09	5.47
Humility – external factors	3.61	1.65	121	3.29	1.77	97	1.39	.17	0.19	2.71

*Note.* Possible range = 0 to 6. Following Jeffreys (1961), we interpret BF<sub>01</sub> as follows: BF<sub>01</sub> < 3 = unclear evidence; 3 < BF<sub>01</sub> < 10 = moderate evidence for the null hypothesis; BF<sub>01</sub> > 10 = strong evidence for the null hypothesis.



Table S5

*Mediation of Awe Intensity-Wellbeing Relationship by Small-Self Perceptions, Randomized Sample, Study 1*

Criterion Measure		Estimate	SE	Z	p
Satisfaction with Life					
Mediation	Indirect	0.08	0.04	1.96	.05
	Direct	-0.04	0.07	-0.55	.59
	Total	0.04	0.08	0.58	.56
Path	Awe intensity → Small self	-0.16	0.08	-2.01	.04
	Small self → Life satisfaction	-0.52	0.06	-8.99	< .001
	Awe intensity → Life satisfaction	-0.04	0.07	-0.55	.59
Presence of Meaning					
Mediation	Indirect	0.10	0.05	2.04	.04
	Direct	-0.006	0.07	-0.08	.93
	Total	0.09	0.08	1.14	.26
Path	Awe intensity → Small self	-0.16	0.08	-2.08	.04
	Small self → Presence	-0.62	0.06	-10.43	< .001
	Awe intensity → Presence	-0.006	0.07	-0.08	.94
Search of Meaning					
Mediation	Indirect	-0.04	0.02	-1.78	.07
	Direct	-0.10	0.09	-1.13	.26
	Total	-0.14	0.09	-1.59	.11
Path	Awe intensity → Small self	-0.16	0.08	-2.05	.04
	Small self → Search	0.28	0.08	3.60	< .001
	Awe intensity → Search	-0.10	0.09	-1.13	.26
Subjective Happiness					
Mediation	Indirect	0.09	0.05	2.01	.04
	Direct	-0.03	0.07	-0.52	.60
	Total	0.06	0.08	0.72	.47
Path	Awe intensity → Small self	-0.16	0.08	-2.05	.04
	Small self → Happiness	-0.59	0.06	-10.05	< .001
	Awe intensity → Happiness	-0.03	0.07	-0.52	.60
Daily Gratitude					
Mediation	Indirect	0.04	0.02	1.76	.08
	Direct	-0.01	0.06	-0.28	.78
	Total	0.06	0.06	0.40	.69
Path	Awe intensity → Small self	-0.17	0.09	-1.91	.06
	Small self → Gratitude	-0.25	0.06	-4.55	< .001
	Awe intensity → Gratitude	-0.02	0.06	-0.28	.78

**Table S6***Elicitor Frequencies (Percentage of Total) as a Function of Narrative Condition, Random Sample, Study 1*

	Individual	Shared	Chi-square	<i>p</i>
Nature	74	57	0.21	.65
Technology	9	14	2.66	.10
Work of art or creative act	31	27	0.09	.76
Individual talent, skill, or accomplishment	46	30	1.31	.25
Other	29	23	0.01	.92